



50¢ A YEAR

July 2, 1960

VOLUME 2 NO. 12 PAGES 7-16

# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Solderless Welding

See Page 14

PHOTOGRAPHED  
CHICAGO, ILLINOIS  
JULY 2, 1960  
873-243 2A 3

A SCIENCE SERVICE PUBLICATION

## PUBLIC SAFETY

# Nuclear Safety Questioned

GOVERNMENT AGENCIES, labor leaders and specialists in nuclear medicine appear headed for a major conflict over industrial nuclear installations as a potential public hazard.

The Atomic Energy Commission, the agency of Government responsible for the industrial development of nuclear energy, has taken the position that "the probability of reactor accidents having major effects on the public ranged from a chance of one in 100,000 to one in one billion per year for every large reactor."

Labor's position, that of the AFL-CIO, is that the AEC tends to "minimize" the danger and thus weakens efforts to prevent accidents.

In testimony before the Joint Committee on Atomic Energy, a spokesman for the AFL-CIO said, "AEC, in our judgment, has not taken adequate steps to meet the radiation hazard problems which we know continue to be serious."

The AFL-CIO charged the AEC with neglect in this area and accused the Commission of withholding "the full truth" of the dangers resulting from accidents that have occurred.

Referring to a serious radiation accident at Oak Ridge which AEC officials had described as "small," Walter Reuther, president, United Automobile Workers, AFL-CIO, wrote Arthur Flemming, Secretary, Health, Education and Welfare, and Chairman of the Federal Radiation Council. In his letter he stated that "efforts to seek full information in order to help develop policy to prevent the repetition of this type of accident revealed the fact that neither the Congress nor the agencies affiliated to the

Federal Radiation Council had been advised of the seriousness of this accident nor of the steps necessary to prevent its repetition."

And Capt. E. R. King, director, Department of Nuclear Medicine, National Naval Medical Center, Bethesda, Md., has stated, "It is doubtful if it is theoretically possible for a radiation disaster to occur of the magnitude described in the novel 'On the Beach'."

"However, it is probable that small-scale disasters will continue to occur . . . with increasing frequency as more and more power reactors . . . are assembled." Capt. King predicted that every major city in the United States will have "in its vicinity a potential source of radiation that could expose a large portion of the population to detrimental doses of ionizing radiation." His prediction was contained in a paper delivered in London, June 20-24, at a symposium on Total Body Radiation, Clinical and Investigative Problems.

Forty American communities, from 1945 to 1959, already have been exposed to the danger resulting from substantial radiation released by a nuclear accident, according to the AFL-CIO. The 40 accidents do not include those involving only single individuals or those which are military in nature.

In April this year, there was an accident at the Oak Ridge National Laboratory. According to the most recent AEC report, more than 100 persons were involved and exposed to radiation from the incident. The radioactive material was spread through the installation by the air-conditioning system.

Decontamination is not yet complete and costs of cleaning work are estimated at about \$39,500.

As a result of another accident two years ago, suit has been filed by eight workers, who suffered higher and more direct exposure to the released radiation, for a total amount of close to a million dollars for health damages including sterility, sexual impotence, and general physical deterioration. The effects of the lower level of radiation on the other workers cannot be immediately determined.

Labor's position is that accidents like this might have been prevented if the AEC had adequately and openly analyzed the facts and factors involved in previous accidents rather than minimizing their extent and number.

Scientific medical opinion is that since such accidents are inherent in the development of atomic energy and weapons, there should be more and better training and planning among doctors and nurses to enable them to cope with such disasters, as well as a program aimed at prevention.

Science News Letter, July 2, 1960

## MEDICINE

## Irregular Heart Action Can Cause Many Troubles

THE ACTION of an irregular heart may cause all kinds of trouble—including blood starvation and perhaps severe damage to brain, kidneys, stomach and intestines.

Using a "space age" electromagnetic flowmeter, Drs. Eliot Corday and David W. Irving of the University of California Medical School and Cedars of Lebanon Institute for Medical Research have demonstrated that irregular heart action can reduce blood flow to these organs by as much as 75%.

Irregular heart action includes premature beats, or systoles, and racing heart, or tachycardia. Such irregular action may be caused by coronary heart disease, an overactive thyroid, or other factors.

When such action occurs, the heart chambers do not fill up enough. The heart pumps virtually empty, failing to send sufficient blood supply to other organs. Even after heart action has been turned to normal by medication, the blood flow to other organs may remain reduced for as long as two hours.

Such a reduction in the brain may bring on a stroke with attendant paralysis or mental disturbance. In the stomach, impaired blood flow will cause distention or ulceration. In the kidneys decreased function will follow.

The investigators urged that physicians make every effort to prevent irregular heart action by use of proper drugs now available.

The flowmeter used in the study is based on the principle developed by Dr. Alexander Kolin, UCLA biophysicist. It is connected to computers, of the kind used to guide space rockets, which help to figure the complex mathematics of flow problems.

The research was supported in part by the Ventura and Santa Barbara County Heart Associations.

Science News Letter, July 2, 1960

## PUBLIC HEALTH

## Fallout Nearly All Gone

THE 1960 spring rains, besides bringing out the flowers, brought down from the high atmosphere considerably less radioactive strontium-90 than in 1959.

The 1959 spring rains held the greatest amount of strontium-90 on record, Dr. Lester Machta of the U. S. Weather Bureau told the American Meteorological Society meeting in Washington, D. C. He believes the maximum exposure to whatever hazards strontium-90 presents has already occurred.

The radioactivity from this fallout product is now disappearing (decaying) at almost the same rate as it is being precipitated on the earth's surface as rain or snow.

Fifteen percent of the total world-wide fallout still is in the stratosphere or upper atmosphere. Within five years, effectively all of this will be down. In the absence of further atomic testing, fallout now on earth or in its atmosphere will decay. As it decays, the hazard it presents to public health will decline.

Authorities from the U. S. Public Health Service division of radiology and biology

recently stated that the levels of strontium-90 resulting from nuclear testing are not sufficiently high to cause alarm.

Meteorological research has determined that strontium-90 levels are as much as 40% higher in the United States, particularly on the East Coast, than anywhere else in the world. Dr. Machta said this may be attributed to weather patterns and proximity to the Nevada test sites.

Meteorologists will welcome the absence of fallout from the upper and lower atmospheres since it will enable them to use naturally radioactive substances to trace weather patterns.

"Fallout debris presents an undesirable background for natural radioactive tracers that enable us to achieve a better basic understanding of the atmosphere," explained Dr. Machta. "The radioactive debris now in our way is like the interference of static on a radio. You may be able to hear your program, but not as clearly as you might if the static was absent." (See story opposite page.)

Science News Letter, July 2, 1960

## MEDICINE

# Kidney Transplant Takes

**A university student in Milwaukee had a successful kidney transplant from his non-identical twin brother 17 months ago despite rejection of tissues shown by skin grafts.**

A PRECEDENT-BREAKING kidney transplant between non-identical twins has proved successful. The operation involved a new transplant technique: total body irradiation which apparently enabled the patient to accept the foreign tissue.

The patient, John Riteris, is now an active student at Marquette University in Milwaukee, Wis., 17 months after the transplant.

Dr. John P. Merrill, one of six physicians involved in the transplant operation at Peter Bent Brigham Hospital in Boston, said in an interview that Mr. Riteris' survival is the longest on record for non-identical twins.

Kidney transplants between even identical twins are quite rare. The Boston group has performed only about ten successfully. The physical similarities between identical twins make simpler the body's acceptance of a foreign organ.

But John Riteris and his brother, Andrew, are not identical twins.

John suffered uremia, an accumulation in the blood of materials that should have been eliminated. The condition is caused by insufficient secretion of urine resulting, in this case, from faulty kidney function.

According to a report in the *New England Journal of Medicine*, 262:1251, 1960, this was the transplant procedure:

The first step was to test skin grafts between the twins. This is a test of tissue acceptance. But the young men's bodies rejected the grafts. Tissue incompatibility existed.

The doctors realized that successful transplantation would demand modification of the patient's immune response that had caused rejection of skin grafts.

This was achieved by doses of X-rays to the patient. This temporarily but not completely impaired the ability of the blood and lymph tissues to reproduce.

The patient's antibody-forming capacity—which normally causes rejection of foreign materials—was thus temporarily interrupted.

According to the doctors, the chronic uremic state of the patient also favored the operation's success. The transplantation took place on Jan. 24, 1959, 24 hours after the administration of the second X-ray dose.

Eight months after the operation it was feared that the kidney transplant might be rejected. But a second course of protracted low-dose irradiation and adrenocorticoid therapy was administered and abnormalities disappeared.

Coauthors of the Journal report with Dr. Merrill were Drs. Joseph E. Murray, J. Hartwell Harrison, Eli A. Friedman, James B. Dealy Jr. and Gustave J. Dammin, all Harvard University professors attached to the Peter Bent Brigham Hospital.

Kidney transplant work at the hospital has been aided by grants from the U. S. Army Medical Research and Development Command of the U. S. Surgeon General's Office, the National Heart Institute of the National Institutes of Health, the U. S. Public Health Service, the National Institute of Arthritis and Metabolic Diseases, the Atomic Energy Commission and the John A. Hartford Foundation.

*Science News Letter, July 2, 1960*

## PUBLIC HEALTH

## High Milk Contamination From Nuclear Accidents

RADIOACTIVE contamination of milk is likely to be "the most widespread hazard" resulting from a nuclear accident or explosion depositing fission products on agricultural land, according to recent studies in England, reported in a forthcoming issue of *Nature* by Dr. R. J. Garner of the Agricultural Research Council Radiobiological Laboratory, Compton, Berkshire.

Elements that appeared to cause the greatest contamination are the isotopes of iodine and strontium although barium-140 and cesium-137 also contribute to the peril.

These findings resulted from a series of 53 experiments with 44 cows in which the fission products were artificially introduced into the diet of the animals and their milk subsequently monitored for radioactivity.



**RIDING ON AIR**—This first functional model of a Hydrostreak craft, 21 feet long, was built by the Hughes Tool Company of Culver City, Cal., for the U. S. Navy. It is shown making a trial run. The vessel rides on top of the water on a cushion of air which is held beneath the craft by a thin wall of water.

Three weeks after contamination of the land on which the cows grazed, strontium-90 levels in their milk were five times as high as on the first day; the levels of barium-140 had doubled; cesium-137 had increased 48 times; Iodine-131 showed an increase of one-third by the third day and then decreased to one-third of the first day's level at the end of three weeks.

The tests were conducted to represent "the worst case likely to occur under conditions of British agriculture," Dr. Garner states. He took account of factors "which, under normal circumstances, would probably reduce the quantity of fission products transferred to milk," such as the dilution of contamination from rain washing the edible herbage combined with the growth of new grass.

But in preparing for control measures to deal with radiation accidents, he emphasizes that no allowances should be made for mitigating factors in order to assure the best protection.

The British study is in line with scientific thinking in this country as reported by Dr. Gilbert B. Forbes, a Rochester, N. Y. pediatrician, in the current issue of *Pediatrics*: "The peaceful use of atomic energy will in time provide fully as great a potential hazard as the bomb-testing program. We must learn to live with the new technology in the years to come."

Aiming at this, United States scientists have joined with radiation authorities from other countries in exploring cheap methods of removing strontium-90 from milk.

Plans currently are under way to construct a pilot plant for this purpose in the United States according to a Canadian design, which appears to be the most promising of several proposals. (See story opposite page.)

*Science News Letter, July 2, 1960*

## ROCKETS AND MISSILES

## Two Satellites Put Up With One Thor-Able-Star

THE UNITED STATES launched a pair of satellites with a single Thor-Able-Star Rocket from Cape Canaveral and signals have indicated all is well.

One of the satellites was Transit II-A, a 36-inch sphere weighing 223 pounds. It is a navigation satellite. Attached to it by a metal band was a 20-inch solar radiation measuring satellite.

After the pair of satellites separated from the rocket, a spring separated the two satellites.

The high orbit of the satellites was nearer to a polar orbit than any yet for a satellite from Cape Canaveral.

The Transit II-A carries an experimental receiver and antenna for measuring cosmic noise above the ionosphere. But its major purpose is navigational. Its transmissions on 54, 324, 162 and 216 megacycles permit a man on the ground to fix his position.

The Transit II-A is the second satellite of a world-wide navigation system expected to be operational in 1962. Transit I-B, was put into orbit April 13.

*Science News Letter, July 2, 1960*



## IMMUNOLOGY

# Jet-Injection Inoculation

MASS IMMUNIZATION against disease by jet injections may provide a breakthrough in the elimination of epidemics that have plagued underdeveloped areas of the world for centuries.

Results obtained with jet vaccine administration in Pakistan give promise of "a new horizon in the field of mass inoculation," Richard L. Towle reports. He is field sanitarian adviser with the International Cooperation Administration's U.S. Operations Mission to Pakistan, Dacca, East Pakistan.

Cholera and typhoid vaccines were administered to the civilian population by means of a "hypospray multidose injector," a compact instrument developed several years ago by the U. S. Army and used with great success for large-scale immunization of military personnel.

Vaccine is forced through a minute opening under high pressure, producing a jet stream that penetrates the surface tissue of the skin.

The vaccine remains in a closed, sterile system, thus eliminating the necessity for sterilization required with the ordinary syringe and needle method of inoculation.

Springs supply pressure for injection, and power is supplied by an electric-motor-driven hydraulic system.

The entire process of loading and firing the injector into the patients requires only a few seconds, Mr. Towle reports in Public Health Reports, 75:471, 1960.

The machine's capability is demonstrated

by the fact that thousands of Pakistanis were inoculated against cholera daily with two injectors.

As many as 6,759 men, women and children were treated by two technicians in one day by hypospray injection, contrasted to a maximum of 100 inoculations per inoculator working with needle and syringe. Thus one injector does the work of 25 to 30 men.

East Pakistan is one of the few remaining endemic areas of cholera in the world, with a reported death rate from this cause of 10,000 annually.

The actual figure is believed considerably higher since infectious diseases are inadequately reported.

The population of East Pakistan is 46,000,000. Its immunization programs are carried on by the limited staff of their Directorate of Health Services which can provide only one vaccinator and inoculator for about every 40,000 persons.

Added to this obstacle of insufficient trained personnel is the psychological aspect of the fear of the needle among the comparatively uneducated masses in the area.

Even the educated classes have reason to fear needle immunization since untrained assistants often neglect the sterilization required and it has not been uncommon for malaria, syphilis and hepatitis to be transmitted by vaccination against cholera and typhoid.

The fact that no needle was used "seemed to impress the people more than

any other factor," according to observations made by Mr. Towle and his staff.

They have set up classes to train sanitary inspectors and doctors in Pakistan to both operate and maintain the injectors. Plans are underway to supply sufficient instruments to enable those now in training to take over the burden of mass inoculation in the area.

In the limited period of nine months in which this method was used by the ICA team, 52.7% of the population of the entire union of Pakistan were inoculated.

Mr. Towle believes the achievement in Pakistan demonstrates that the jet injectors "can be used effectively . . . in the prevention of disease in any situation which calls for mass inoculation."

Science News Letter, July 2, 1960

## SCIENCE NEWS LETTER

VOL. 78 JULY 2, 1960 NO. 1

Edited by WATSON DAVIS

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N.W., Washington 6, D. C., North 7-2255, Cable Address: SCIENSERVC.

Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; ten or more copies in one package to one address, 7½ cents per copy per week; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

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Printed in U.S.A. Second class postage paid at Washington, D. C. Established in mimeograph form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index. Member Audit Bureau of Circulation.

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## MEDICINE

# Inflammation in Arthritis

A THEORY as to the cause of inflammation associated with rheumatoid arthritis was proposed at Hollywood, Fla., by Dr. Charley J. Smyth, president of the American Rheumatism Association.

He pointed an accusing finger at "mast cells." These are cells that tend to cluster outside the capillaries, small veins and small arteries.

They are also found in skin, heart, lungs, gastro-intestinal tract and membranes surrounding joints, all tissues that undergo changes in connective tissue diseases such as rheumatoid arthritis.

Mast cells are also known to secrete or contain three powerful chemical substances: heparin, which prevents blood clotting; histamine, which dilates capillaries, and serotonin, which acts like a hormone and helps transmit nerve impulses across brain tissue.

It is also believed that cortisone, which temporarily suppresses joint swelling but may cause increased inflammation of blood vessels, acts by stimulating mast cells.

Dr. Smyth, an associate professor of medicine at the University of Colorado, suggested that a chain of events leads to chronic joint inflammation and formation of scar tissue around blood vessels.

First, some mechanical, chemical or allergic damage occurs near a blood vessel. Mast cells then release their granules into the jelly-like matrix into which connective tissue fibers are imbedded.

If steroids, such as cortisone, are given, the mast cells may be stimulated into releasing heparin.

An arthritic patient who receives a minor skin injury while he is taking the cortisone may thus develop an ineffective blood clotting mechanism. This actually shows up as vascular skin lesions or hemorrhages on the hands and forearms in many arthritic patients.

Because of the presence of mast cells and histamine, capillaries may be dilated, fluid accumulate and edema result.

Finally, granules released by the mast cells would form scar tissue from collagen fibers. In chronic inflammation, mast cells increase in numbers and eventually a scar tissue composed largely of collagen fibers is formed.

Serotonin may enter the picture by stimulating the production of fine fibers.

Dr. Smyth said "mast cells can be looked upon as prime movers in the chain of events we know as the inflammatory reaction."

Science News Letter, July 2, 1960



## MEDICINE

# Fertility Restored in Men

**A California doctor has perfected a technique that holds hope for sterile men. A plastic disc placed in the front chamber of the eye is restoring sight.**

THERE IS new hope for men who have had surgical operations for sterilization. A California doctor has perfected a hollow-splint technique to restore fertility in such cases and so far it has been successful.

Dr. Stanwood S. Schmidt, a urologist practicing in Eureka, Calif., told the American Medical Association in Miami Beach, Fla., that presently established techniques failed 50% of the time, usually because the sperm tube becomes blocked again.

In sterilization, the vas deferens, or sperm tube leading from the testis to the storage capsule, is cut or tied shut in the middle. The tied end closest to the body becomes bulged a little, probably because of a slight pressure from spermatic fluid in the testis. The operation is performed on both sperm tubes.

In the usual restoring operation, the tied ends are reopened and rejoined, bulged end to smooth end. This makes a crooked joint around which spermatic fluid collects, hardens and eventually plugs up the tube again.

This crooked rejoining and the blocking by calcified spermatic fluid is the cause of most of the failures, Dr. Schmidt said.

In his new technique, developed in dogs under a grant from the Population Council, Inc., Dr. Schmidt cuts out the bulged section, about half an inch long. He then inserts a tiny polyethylene tube through the skin, into the vas deferens and passes it down past the spot where the cut ends are later sewed together.

This hollow splint not only insures a straight joining, but also allows the spermatic fluid to by-pass the sewed spot and drain off into the bandages.

In about ten days the ends have healed together smoothly, the polyethylene splint is removed and fertility has been restored.

In Dr. Schmidt's experiments with young male dogs, microscopic examination of the vas deferens and its surrounding tissue showed no more inflammation than any other clean wound 30 days after operation, indicating that the polyethylene is not reactive. There was no calcification of spermatic material.

Although not yet widely used, the technique has been tried in a few men and has been satisfactory. Dr. Schmidt believes doctors can now tell patients that surgical sterilization in men no longer need be permanent.

Science News Letter, July 2, 1960

## Lens Restores Sight

A METHOD for restoring sight to the blind and nearly blind was described to the American Medical Association meeting in Miami Beach, Fla.

The operation consists of implanting a

plastic disc, about five millimeters in diameter, in the front chamber of the eye, between the eyeball covering and the iris. It is, in effect, something of a substitute lens placed inside the eye, rather than outside like a contact lens.

Because the technique is not yet used in the United States, Dr. Benedetto Strampelli of Italy and Dr. David P. Choyce of England were asked to report their experience with the technique to American doctors.

Dr. Strampelli, who began using the technique in 1953, said his surgical procedure was to cut away a tiny part of the iris and then sew the "lens" in place, by hooking fine threads to the lens supports, attached at top and bottom. The operation is somewhat like hanging a round picture at the eye's front.

The original, and still most frequent, use for the method is in persons born without eye lenses, a condition known as aphakia.

Dr. Choyce, a consultant ophthalmic surgeon to London area hospitals, said that in 200 of the 250 cases he has treated since 1956, six have been failures resulting in loss of the eye. Some patients were given near-normal vision while others benefited by being able to perceive light and darkness.

Of the 200 cases, the second 100 cases showed better results than the first. Dr. Choyce said he now has a better idea which cases will respond favorably and is selecting accordingly. He has also improved the surgical technique.

"Implants," as Dr. Choyce prefers to call the discs, have been successful in cases other than aphakia.

An 18-year-old who had cataracts removed from both eyes as an infant was blind and had learned braille, but with implants in both eyes he can now read and write normally.

Similar procedure has proved effective for elderly patients with cataracts in both eyes.

In another case a nine-year-old girl was becoming progressively nearsighted. Family history indicated she would be blind before age 30. Implants in both eyes allowed her to continue school. Whether blindness was halted or merely slowed remains to be seen.

The disc has been used to protect the iris from surgical scratching during operations to replace badly fogged or scratched eye-covering. When the covering is healed the implant is removed.

Although American physicians do not use the implant at present, they have been aware of it for some time. Several have written Drs. Choyce and Strampelli to suggest new uses. Both doctors cautioned against overworking the implant because the technique is still far from perfect and should be used in only one eye if possible.

Science News Letter, July 2, 1960

## Contact Lens Dangers

THE AMERICAN Medical Association, long unofficially at odds with optometrists over contact lens fitting, has made its position official.

A resolution adopted by AMA's policy-making House of Delegates at the annual AMA meeting in Miami Beach, Fla., states that "the use of such lenses (contact) is not entirely without hazard; . . . the fitting of contact lenses is a proper medical function of the physician; (and) that this House views with grave concern the indiscriminate use of contact lenses."

The resolution as it now stands is a milder version of the original submitted by Dr. Ralph O. Rychener, ophthalmologist at the National Medical Foundation for Eye Care in New York.

In the 11-paragraph original, Dr. Rychener narrowly missed calling the practice of contact fitting by optometrists dangerous. An excerpt reads: "The use of contact lenses can at times lead to serious permanent impairment of vision. The proper application of contact lenses requires, as much as does the use of drugs or surgery, a knowledge . . . which can be acquired only by a medical training."

In closed-door sessions a subcommittee seeking to avoid "legal trouble" from optometrists, licensed by their home states to fit contacts, drafted a less strongly-worded resolution.

It was with Dr. Rychener's consent that the new, five-paragraph version was submitted to and accepted by the House.

Science News Letter, July 2, 1960

## Predict Heart Attacks

A RADIOACTIVE TECHNIQUE for measuring the flow of blood through the human heart—one way to tell how well it is working—was shown at the annual meeting of the American Medical Association in Miami, Fla.

The two physicians who devised the method, Drs. Philip C. Johnson and Gunnar Sevelius of Oklahoma City, have begun a study to determine if it can be used to predict a predisposition to heart attacks.

" . . . one of the most pressing unsolved medical problems of today is the finding of a way to evaluate the status of coronary circulation in patients without symptoms or complaints," they said.

The researchers said their method was developed over the past two years as part of a program for testing the effectiveness of various types of drugs used in treating coronary disease.

They found that after administering a nitrate, such as nitroglycerin and peritrate, it was possible to monitor the radioactivity of the drug within the heart by placing a device called a scintillation detector on the chest of the patient.

By a mathematical formula, using the time it takes for this activity to affect the right and left sides of the heart and the heart muscle, it is possible to determine the coronary blood flow and the amount of blood pumped through the heart.

Science News Letter, July 2, 1960

## PSYCHIATRY

# Need Psychiatric Help

MANY MORE Americans have emotional disturbances or face problems needing psychiatric help than ever see a psychiatrist.

In many cases they never call on anyone for help, neither psychiatrist, nor minister, social worker, family counselor, or even their own family. They try to work out the problem by themselves or wait hoping it will go away. A few resort to prayer.

This was revealed when personnel of the University of Michigan's Survey Research Center interviewed 2,460 Americans over the age of 21. Those interviewed were scientifically selected to constitute an accurately proportioned miniature of the "normal," stable, adult population of the United States.

They were typical of the whole population in age, sex, education, income, occupation and place of residence. No one was a transient or in hospital, prison or other institution at the time of the interview. The interviews lasted from one to four hours and averaged nearly two hours.

Asked whether he had ever had a problem in which professional help would have been useful, nearly one in four said he had had such a problem. Only one in seven actually went for help, and these were mostly women, younger people, and the better educated.

One out of five reported that at some time during life he had felt that he was going to have a nervous breakdown. In such a crisis, almost half consulted a professional source of help. Nine out of ten seeking help went to a doctor.

Surprisingly perhaps, the hydrogen bomb,

international tensions, summit blow-ups or presidential elections do not figure importantly among the things that Americans report as troubling them.

A major source of both happiness and also unhappiness is money—or the lack of it. But when they mention money as fundamental to happiness, the typical American is not thinking of great wealth. He means ability to pay his bills and possession of a "good home."

In other words he is thinking of comfort, not luxury. Economic and material considerations represent the only category frequently mentioned as a source of happiness and also a source of unhappiness.

Children, marriage and the family are of outstanding importance as sources of happiness but they are much less often considered as sources of unhappiness.

In general, worriers are "not too happy" and those who are very happy do not worry very much. And frequently the same sources are cited for unhappiness and for worry. But there are differences.

Worriers have a different view of the future from the unhappy. Those who are "not too happy" are more frequently pessimistic about the future than are the happy. But the people who "worry all the time" look forward to a better future.

Worrying implies to some extent a positive and hopeful view of life; unhappiness, a negative, passive view.

Detailed results of the survey, which was made under the direction of Dr. Angus Campbell, will be reported in "Americans View Their Mental Health" (Basic Books) by Drs. Gerald Gurin, Joseph Veroff and Sheila Feld.

Science News Letter, July 2, 1960

## GENERAL SCIENCE

# Research Budget Increases

THE UNITED STATES will spend 15 billion dollars or more on research and development in 1962 if present trends continue.

The analysts, most of them connected with stock brokerages, project the 1962 expenditures from present expenditures, including statistics just released by National Science Foundation in Washington, D. C., on research and development in 1958.

They speculate that the research will begin to have a major impact on business in the mid-1960's.

Their predictions are based on these statistics:

1. Research and development is increasing at a fast clip. Money spent on these purposes by both Government and private industry was less than two billion dollars in 1945, the peak war year. In 1953, a little more than five billion was spent. Estimates of 1959 expenditures set these at about \$12.4 billion.

2. Government funds for basic research alone represented 23% of all research ex-

pensitures in 1956. In fiscal 1960, basic research has risen to about 31% of the total. In basic research, the more revolutionary discoveries are generally made.

3. The 1961 budget is shaping up so that Government expenditures for research and development will be nearly eight and a half billion dollars.

4. From past years, it can be estimated that these Government funds will be 60% of the total money spent. Thus, total expenditures should be about \$14 billion in 1961.

Government funds began increasing sharply after Korea.

The 1961 Federal budget requests for basic research total \$600,000,000—20% more than in fiscal 1960. This pure research may bring new knowledge that will permit new products to come to market from 1965 to 1970.

While the Government supplies the money for its research projects, about 75% of the work may be done by private firms.

For instance, according to the final

breakdown by the National Science Foundation, the Federal Government financed more than four and a half billion dollars worth of industrial research and development in 1958. Much of the money went into defense projects. (The money spent was three times that spent in 1953.)

The Foundation reports that industrial research and development in 1958 accounted for three-fourths of the \$11 billion total spent in 1958.

But the Federal Government put up the funds for 56% of the industry total and perhaps about 60% of the total used by industry, universities and other groups, including those of the Government itself.

Businessmen estimate that of the total research and development in the next year, 1959, two and a half billion dollars or 20% was spent in electronic fields such as transistors.

Because of their high research and development expenditures, these industries are particularly watched by business analysts: atomics, chemicals, electronics (including information systems and infrared), pharmaceuticals and rare metals.

Science News Letter, July 2, 1960

## AEROMEDICINE

## Take First Course In Space Surgery

THE FREE WORLD'S first course for space surgeons is now under way at the Air Force Missile Test Center at Cape Canaveral, Fla.

A select group of medical officers from the Air Force, Army and Navy will be the first doctors to be qualified for this specialty under this new program.

The course was introduced by Gen. Oliver K. Niess, Surgeon General of the Air Force, and Col. George M. Knauf, staff surgeon at the Air Force Missile Test Center, who planned the intensive two-week project. Its purpose, according to Col. Knauf, is to make available a pool of qualified medical officers from the three services who will be able to perform duties as space surgeons to support the requirements of NASA's Project Mercury and future man-in-space programs.

Subjects for study will range from the history of astronautics to acceptable metabolic aberrations in space operations. It is estimated that 50 doctors will be qualified as space surgeons this year under this pioneer medical program.

Science News Letter, July 2, 1960

## BIOLOGY

## Shovel-Nosed Snake Found in Australia

A SHOVEL-NOSED snake that burrows into the ground has been found near Alice Springs, Australia. A dwarf snake, previously unknown, it is light gray with black marks on its snout and neck. The specimen found was five and one-half inches long. It has been named the Australian "Hognose."

Science News Letter, July 2, 1960

## TECHNOLOGY

# Machine Learns Alphabet

AN EXPERIMENTAL machine that correctly identifies letters of the alphabet—even letters of a writing style it has never seen before—was demonstrated publicly for the first time in Buffalo, N. Y.

Called the Mark I perceptron, the machine's alphabet recognition represents a breakthrough in data processing. Existing digital computers fundamentally handle numerical data.

Future perceptrons may be used in situations which now require human operators to differentiate between patterns and objects.

The machine was developed by Cornell Aeronautical Laboratory, Inc.

The perceptron can correctly identify letters of a type face it has "seen" before. When another type face is introduced, the machine is still correct 79% of the time.

The machine is taught to recognize letters almost as a child is. The trainer places test patterns in view of the machine's photo cell eye. The trainer leaves the machine alone when it makes a correct identification.

But when the big machine errs, the trainer corrects it, using electrical controls to force the right answer out of the machine.

After only 15 exposures to a letter, the machine can recognize it from then on as long as the letter is written in the same style.

If the machine's trainer accidentally makes occasional mistakes and forces the wrong answer from the machine, the machine can overcome this bad training. It will take longer, but the machine eventually will recognize the test patterns without error.

And as a child eventually learns to read various handwriting styles, the machine can eventually recognize partially obscured or distorted patterns—though not without some error.

In other words, the perceptron can generalize.

The perceptron can be taught to learn other patterns besides those of the alphabet, but its major application would seem to be in alphabet recognition. It might, for instance, be incorporated into translating machines.

The Cornell scientists, however, emphasized the present equipment was for research only.

Dr. Frank Rosenblatt, 31, a research psychologist, originated the perceptron theory and is in charge of the Cornell program.

He said the Mark I system can perform only very simple recognition tasks but is of scientific interest because of its use of new principles. The Office of Naval Research and the Rome Air Development Center both finance the perceptron work.

A representative of the Center said that

"during November of 1958 the Intelligence Laboratory of RADC became strongly convinced that developments in self-organizing systems could represent a significant breakthrough in the field of intelligence data processing."

Dr. Rosenblatt originally conceived of the perceptron as a model of a biological nerve net. He believes the machine to be based on theoretical models consistent with current anatomical and physiological data.

Science News Letter, July 2, 1960

## METALLURGY

## Metallurgists Develop New Columbium Alloys

DEVELOPMENT of new alloys of columbium that meet space age and nuclear requirements was reported at a symposium on columbium metallurgy in Bolton Landing, N. Y.

Columbium is one of the several relatively uncommon metals, such as beryllium, that have become increasingly important for atomic reactors and high-performance jet and rocket engines because of their peculiar properties at high temperatures. Extensive deposits of columbium ore were recently discovered in Quebec.

Alloys of columbium containing tungsten and titanium were found to resist oxidation at temperatures up to 2,550 degrees Fahrenheit, while maintaining good mechanical properties.

Those containing aluminum and vanadium retain their low neutron cross section but have oxidation rates only a hundredth the rate of pure columbium.

Metallurgists at Union Carbide Metals Company also investigated alloys containing varying amounts of titanium, molybdenum, chromium and zirconium.

Science News Letter, July 2, 1960

## MINING

## Use of Nuclear Blasts In Mining Sulfur Studied

NUCLEAR EXPLOSIONS may be used to mine sulfur in the Gulf of Mexico, the joint meeting in Mexico City of the American Institute of Chemical Engineers and the Instituto Mexicano de Ingenieros Quimicos was told.

John M. Dales and Roger C. DeHart of the Southwest Research Institute in San Antonio, Texas, said nuclear mining would be cheaper than methods currently in use such as the usual Frasch process.

The sulfur could be melted by heat from a small nuclear device and then forced up a bore-hole by hot water or steam that is forced down a second bore-hole.

The engineers expect new deposits of sulfur will be discovered under the Gulf of Mexico. They say studies are now being made for recovery of the sulfur by nuclear explosions.

Mr. Dale and Mr. DeHart said that, although the explosion would be entirely contained underground and quite safe, the greatest obstacle to its use would be the lack of understanding on the part of the public.

Science News Letter, July 2, 1960



**PERCEPTRON**—Mark I perceptron, built by the Cornell Aeronautical Laboratory, Buffalo, N. Y., can be 'trained' to recognize automatically the letters of the alphabet. An engineer is adjusting the photo cell 'eye' to recognize the letter C.



## MEDICINE

## High Blood Pressure Thought Related to Rage

IS THERE a direct relationship between rage and high blood pressure—as expressed in the common saying “Calm down or you’ll burst a blood vessel”?

Dr. Charles W. Wahl, psychiatrist at the University of California Medical School, Los Angeles, thinks such a relationship may be more truth than folklore and could offer a clue to more effective treatment of high blood pressure in some cases.

The cause of a certain type of high blood pressure known as essential hypertension is unknown. However, psychotherapeutic studies have demonstrated evidence of massive repression of unacceptable feelings in these patients, Dr. Wahl said.

These feelings include hostility or repressed rage, generally equated with a “murderous loss of self control.” They also include an inordinate fear of death.

Just how repressed rage and resultant prolonged tension may contribute to this type of high blood pressure is also unknown, he said. Perhaps certain constricting effects of emotional stress on blood vessels over long periods of time may contribute to organic changes in the vessels.

Dr. Wahl’s experiences with such patients have led him to believe that intensive insight psychotherapy begun in a well-motivated patient before such irreversible organic changes have occurred goes a long way toward alleviating or vastly modifying the disease.

Such patients should continue medical treatment by their general physician, or internist, he emphasized.

Science News Letter, July 2, 1960

## MEDICINE

## Animal Tumors Produce “Disease Compounds”

A BEWILDERING assortment of “disease compounds” associated not only with cancer but with other serious illnesses as well are being produced by experimental animal tumors.

Drs. William G. Clark and William J. Hartman of the University of California Medical School, Los Angeles, and the Sepulveda Veterans Administration Hospital are conducting research with mast cell tumors, which are transplantable in animals.

Normal mast cells are tiny depots of interesting compounds. Clusters of them are found in the body, particularly in the connective tissue sheathing of organs and tissues. They are also found in association with inflammation and cancer growths.

The cancerous mast cells produce in large quantities not only the compounds of normal mast cells but several others that may not be present in the normal mast cells or present in too small amounts to be recognized.

Chemicals so far identified in mast cell tumors have been implicated in mental disease, shock and allergy, inflammation, circulatory and heart diseases, high blood pressure, rheumatic heart disease, excessive

stomach secretion and irregularities of nerve transmission.

These include histamine, which is released in high concentration during allergies and acute infections; serotonin, which may be involved in brain function; adrenalin and noradrenalin, the stress hormones; and heparin, blood clotting agent.

Drs. Clark and Hartman are attempting to learn how all these compounds in mast cells are produced and stored and enter into body chemistry. They are also seeking natural or artificial chemicals which would block the production of these substances. These might lead to more effective control of diseases in which these substances are implicated.

The research is supported by the National Science Foundation, California Institute for Cancer Research, U. S. Public Health Service and American Cancer Society.

Science News Letter, July 2, 1960

## PUBLIC HEALTH

## Health Insurance Booms; Covers Most Americans

HEALTH INSURANCE coverage, as well as the amount of benefits paid, reached a new high in the United States last year.

Voluntary health insurance protected more than 127,896,000 Americans—72% of the civilian population—by the end of 1959, according to the 14th annual survey by the Health Insurance Council. About 4,800,000 more persons were covered by health insurance than in 1958.

Benefit payments for hospital, surgical and medical care amounted to more than \$4.3 billion in 1959, up \$400,000,000 over 1958. In addition, persons with loss-of-income policies received \$838,000,000 in benefits from insurance companies to replace income lost through disability.

More than 90% of those with health insurance have both hospital and surgical expense insurance. Five years ago, the figure was 85%.

Science News Letter, July 2, 1960

## SEISMOLOGY

## Nuclear Explosions Cause Earth Waves Far Away

LARGE NUCLEAR explosions cause the earth to vibrate far from the detonation site, three Columbia University scientists have reported.

Drs. Maurice Ewing, director, and Paul Pomeroy and Jack Oliver, all of the Lamont Geological Observatory, Palisades, N. Y., said that there was a great contrast between the earth waves resulting from nuclear explosions and from natural earthquakes. Most of those generated by nuclear blasts can be easily identified, they reported in *Science*, 131:1804, 1960.

The seismic waves caused by explosions of atomic or hydrogen bombs have periods longer than five seconds, and can be detected at great distances from the source. All the waves so generated can be identified and explained in terms of known earthquake information, they said.

Science News Letter, July 2, 1960

# IN SCIENCE

## ASTRONOMY

## Modified Interferometer Measures Stars' Passage

A SIMPLE instrument that can measure the diameter of stars and record the time they pass overhead has been developed by the National Bureau of Standards, Washington, D. C.

This type of instrument, called an interferometer, also provides a means of checking aberrations of telescopes. The instrument, developed by J. B. Saunders of the Bureau staff, consists of a double-image prism and a telescopic lens system. It is more practical and efficient than interferometers previously made.

The instrument is a wavefront-inverting interferometer. The prism used is a modified Koesters prism consisting of two identical prisms cemented together with a partially reflecting film on the inner face.

Science News Letter, July 2, 1960

## TECHNOLOGY

## Nuclear Plant to Produce Fresh Water From Ocean

FRESH WATER from the sea soon may be available at low cost by means of nuclear energy, as a result of a joint effort of the Saline Water Division of the Department of the Interior and the Atomic Energy Commission.

The signed contract for the nuclear portion of this program is \$4,500,000. Five years ago, estimates for the type of nuclear reactor necessary for de-salting water ranged as high as \$4 to \$5 billion.

Experts predict that the use of nuclear power for the desalination program will make available fresh water from the ocean at no more than the present cost of drinking water in the 400 largest cities in the United States. The site chosen tentatively for the nuclear desalination plant is San Diego, Calif.

Science News Letter, July 2, 1960

## PUBLIC SAFETY

## Toy Car Axles Wound Children's Heads

THREE CASES in which children's skulls were punctured by the metal axles of rubber or plastic toy cars have been reported by Drs. William H. Mosberg Jr. and John O. Sharrett of the University of Maryland School of Medicine. They reported in the *Journal of the American Medical Association*, 173:804, 1960, that when a child strikes his head against these flexible cars, the axles remain rigid and puncture. They advised manufacturers to mount wheels on small pins instead of on axles traveling the width of the car.

Science News Letter, July 2, 1960

# CE FIELDS

## ROCKETS AND MISSILES

### Fast Engine Planned for Interplanetary Travel

AN EXPERIMENTAL ion engine far different from conventional rocket engines will be built in a year-long \$500,000 program sponsored by the National Aeronautics and Space Administration.

As now conceived, the cylindrical ion engine measures only about eight inches long and four inches in diameter but produces an ion stream developing speeds of more than 100,000 miles an hour.

The small laboratory engine will, however, develop only about a hundredth of a pound of thrust. When bigger engines are developed, NASA hopes to use them to propel spacecraft on interplanetary missions.

Their power source would be a nuclear reactor such as the SNAP-8 now being developed.

In the proposed NASA ion engine, an alkali metal atom (cesium) stream passes through an electrode. The hot electrode pulls an electron from the cesium atom, thus creating a positively charged ion that can be accelerated by other electrodes.

Other electrons are mixed with the ion stream so a neutrally charged beam finally leaves the engine.

Hughes Aircraft Company of Culver City, Calif., will design, develop and test the engine under NASA contract.

Science News Letter, July 2, 1960

## CONSERVATION

### New Group to Study Effects of Pest Control

THE EFFECTS on America's wildlife of chemicals used to control agricultural pests will be investigated by a special committee appointed by the National Academy of Sciences-National Research Council.

The new Committee on Pest Control-Wildlife Relationships is a response to a growing concern among conservationists that some of the more recent chemical controls, while advancing both agriculture production and public health, may be harmful to desirable wildlife.

The Committee seeks to establish a sound program for effective plant protection without causing permanent damage to useful animals.

Among its functions will be to provide guidance and technical advice toward that goal; to evaluate both the direct and indirect effects of various pest control operations on both plants and animals; to stimulate new research and encourage current research now in progress to get the necessary information for sound guiding principles; and to foster cooperation among the various agencies and institutions with a legitimate concern in the areas of pest control and wildlife conservation.

In the past, persons responsible for pest-control programs have tended to minimize the harmful effects of chemicals used for this purpose on animal life. In some instances, conservationists have exaggerated the damage to wildlife and ignored the benefits they have contributed to both farmer and consumer.

Dr. Detlev W. Bronk, president of the National Academy of Sciences, expressed the hope that the Committee might achieve harmony and understanding between the two groups in "this increasingly important and somewhat controversial field of agriculture."

Science News Letter, July 2, 1960

## PHYSIOLOGY

### Light Work May Demand As Much Energy as Heavy

MEN WHO WORK in light industries, such as a sewing machine plant, may expend as much energy as men working in heavy industries like steel, a study of elderly working men shows.

Dr. J. V. G. A. Durnin of the department of physiology at Glasgow University in Scotland studied the energy output of men between 60 and 65. He found:

In the steel industry, where men do strenuous work but do it infrequently, the average elderly worker expends 3,300 calories a day.

In a truck assembly plant, the daily average was 2,700 calories.

In the sewing machine plant, where many of the men sat all day at an assembly line, the average was 3,300 calories a day. These figures took into account the rest of the day, but most of the men were extremely idle in the evenings.

"We may have been very wrong in what we think elderly people can do in industry," Dr. Durnin said.

"Elderly people may require to take in more energy in the form of food than young people," he said, "even when both may be doing precisely the same job, as well as taking the same amount of exercise. Elderly people are, on the whole, bulkier and therefore use up more energy in doing the same work."

A factor that caused heavier demands to be made by so-called "light" jobs was that a light task was more likely to be a continuous one all day long except for meal breaks, whereas the man with a strenuous task to do relaxed in between the demands of the job.

Science News Letter, July 2, 1960

## CHEMISTRY

### Bleaching Strengthens Cotton Fabrics

WET FINISHING processes such as desizing, scouring and bleaching make outdoor cotton fabrics stronger and less likely to mildew, the U. S. Department of Agriculture's Southern Utilization Research and Development Division in New Orleans, La., has found. The processes tend to purify cotton cellulose and reduce foreign substances that encourage the growth of microorganisms.

Science News Letter, July 2, 1960

## PUBLIC HEALTH

### No Added Radioactivity From Disposed Wastes

A SURVEY of a site off Boston Harbor once used for the disposal of limited quantities of packaged radioactive wastes has failed to reveal any unusual radioactivity.

In samples of water, sediments and marine organisms, the radioactivity detected was found to be in the same range as that of background activity at other ocean locations where no radioactive wastes have been dumped.

The site was used under Atomic Energy Commission authorization and license from 1952 to August, 1959, for the disposal of low-activity packaged radioactive wastes which had a total of 2,434 curies at the time of disposal.

No further use of the area off Boston Harbor for disposal purposes is contemplated. The Commission's present policy is to require that wastes be disposed of in water at least 1,000 fathoms deep and the Commission is not contemplating any change in that policy.

The Massachusetts Bay site is one of four off the New England coast studied during the past year by scientists from the University of Connecticut, the U. S. Coast & Geodetic Survey and the U. S. Public Health Service, working in conjunction with the Bureau of Commercial Fisheries of the U. S. Fish & Wildlife Service.

Science News Letter, July 2, 1960

## MEDICINE

### Body Hormone Found Most Powerful Stimulant

A BODY HORMONE, aldosterone, has been found to be 250 times as powerful a heart stimulant as the most effective drugs known.

Drs. Ralph D. Tanz and George Sayers of Western Reserve University in Cleveland, Ohio, reported at the American Chemical Society's Medicinal Chemistry Symposium in Kingston, R. I., that the chemical structure of this hormone could serve as a model for more efficient drugs to treat heart disease.

In the treatment of heart disease, the most important drugs available are the cardiac glycosides. Unfortunately they are rather toxic when administered in large doses.

The Cleveland doctors found that aldosterone caused muscle contraction in the same way that digitalis and other heart drugs do, but that the amount needed was only 1/250th as much as ouabain, one of the most powerful heart stimulants.

In experiments with isolated heart tissue, the doctors found that aldosterone has "apparently provided us with a cardiac glycoside (heart-stimulating drug) of our own." Ordinarily, the adrenal glands produce small quantities of aldosterone but in victims of heart attacks the level is markedly elevated.

The doctors said this indicates a protective mechanism to improve the function of the failing heart.

Science News Letter, July 2, 1960

## FOOD TECHNOLOGY

# Irradiated Food: Pro and Con

An Army nutrition expert believes irradiated food may some day be preferred. But an Army physician reports that radioactivity is measurable in food irradiated at large doses.

By TOVE NEVILLE

ONE ARMY FOOD EXPERT predicts that people may some day prefer irradiated food to canned or frozen, but a doctor in the Surgeon General's Office has "serious doubts as to the ultimate wholesomeness of irradiated food."

These two points of view represent the two basic problems of food irradiation: consumer acceptance and the safety and wholesomeness of such foods. Until these problems are solved, irradiated food will not be served either to the Armed Forces or civilians.

The Army has experimented with irradiated food since 1953. If food could be shipped and stockpiled without refrigeration for use as needed, military supply problems would be greatly simplified. Such food could also be brought to fighting areas lacking refrigeration.

As a result of Congressional interest, the Quartermaster Corps expanded its food irradiation program in 1955 to cover food items for both military and civilian use. This project, lasting until this year, was part of the Atoms for Peace Program.

## Sterilized or Pasteurized

Irradiated foods are either sterilized or pasteurized by radioactivity. In sterilization, the food is first packed in sealed cans. When thoroughly irradiated, all bacteria in the food are killed, and the food will stay fresh as long as the container lasts and keeps the food from contact with the air.

Food sterilized by radiation is given 4,500,000 to 5,000,000 rads, or 4.5 to 5 megarads. A rad is a newly chosen unit of absorbed dose of radiation.

It is not now known how much radiation it takes to sterilize various foods. Tests are continuing to pinpoint the differing doses required for each kind of food. Acidity, density and the food's liquid-solid content help determine the amount of radiation required for sterilization.

The less dense a food, the easier it is sterilized. A liquid is generally more easily sterilized than a solid. To be on the safe side, high doses of radiation are given for sterilization. But taste tests of sterilized food show that the less radiation, the less loss of flavor and change of color and texture.

Therefore, a low-dose method, called pasteurization, has been adopted for many food items that are ordinarily kept only a short time, either in a refrigerator or at room temperature. This method kills only the bacteria on the outside of the food. However, it has increased the "shelf life" of such foods up to ten times.

In experiments, potatoes irradiated at 10,000 rads remained in good condition ten times longer than untreated ones. The treated potatoes were still fresh after 18 months at a temperature of 47 degrees Fahrenheit and had not sprouted, Col. William B. Levin, radiation officer for the Quartermaster General, told SCIENCE SERVICE.

He said that oranges irradiated at 150,000 rads were still fresh after 70 days at 45 degrees Fahrenheit.

Col. Levin said that one difficulty in feeding irradiated food to humans is that after a time they tire of eating foods having unaccustomed tastes.

However, sometimes people will become accustomed to eating a certain food in its canned form and actually prefer it to the natural form. He cited tomato juice as an example.

Tastes can change with education. Today the population is generally "educated" to drink pasteurized milk and has come to like and accept its taste. To most persons used to drinking pasteurized milk, the natural product would taste foreign and very likely disagreeable.

The Quartermaster Corps is trying to improve methods of irradiating foods to make them taste like the natural product or like the food people are accustomed to eating.

Irradiated ham and shrimp now taste more like the fresh products than do heat-

canned ham and shrimp, Col. Levin said. So also do chicken, pork and bacon.

Irradiating beef, yet retaining its natural flavor, has proved difficult. In early experiments, irradiated beef had a distinct, disagreeable taste and odor. Lately both the taste and smell have been improved.

Irradiated vegetables, like meats, have shown differing results. Many of them, such as carrots and pumpkin, approach their natural look, smell and taste. Others, such as cauliflower, celery and cabbage, are not so successfully irradiated.

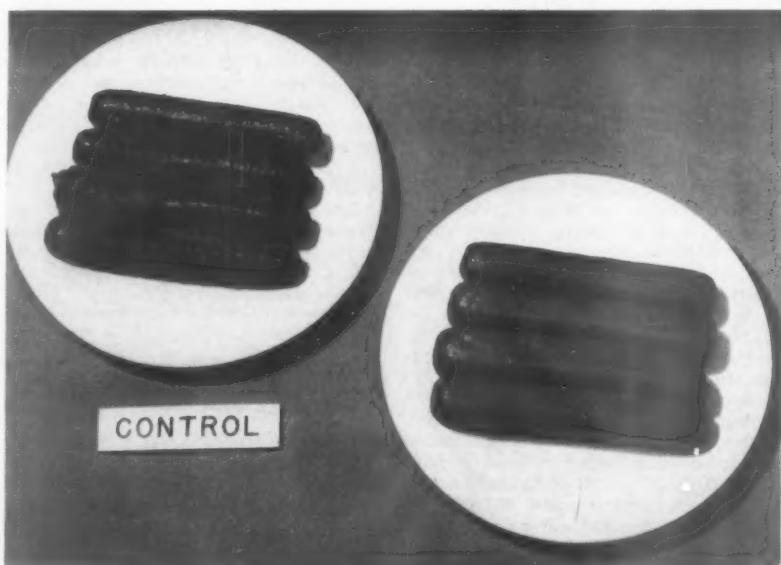
Such fruits as peaches and applesauce, when tested after six months, were both quite acceptable in taste and appearance, although the applesauce had turned a little dark, Col. Levin said.

He estimated that the price of irradiated food would some day be comparable to other preserved foods. Col. Levin believes that wholesomeness studies with animals during the next two years will prove the safety of irradiated food.

## Wholesomeness Yet to Be Proved

But a physician of the U. S. Army Medical Research and Development Command, of the Surgeon General's Office, Col. Lawrence M. Hursh, is not as optimistic. He told SCIENCE SERVICE that he doubted whether the wholesomeness of irradiated food would be proved by the time current animal studies end in December, 1963.

The most important problem is that some of the methods used for irradiation at high doses leave measurable radioactivity in the food, Col. Hursh said.



**COMPARING HOT DOGS**—Both plates of hot dogs have been stored for four months at 72 degrees Fahrenheit. Control samples at left have not been treated in any way, while those at right have been irradiated.



Irradiation by linear electron accelerators at 24,000,000 electron volts (Mev) and by fuel rods under water has produced measurable induced radioactivity in foods at levels of several times the background radiation.

He said that irradiated food will be accepted for wholesomeness by the Surgeon General's Office when the U. S. Food and Drug Administration accepts it. He believes a cobalt source is the most promising for food irradiation. So far, no radioactivity has been measured in food irradiated by cobalt.

Col. Hursh said that when food is irradiated, the radiation modifies the atoms in the food to form peroxide, carbonyls and aldehydes from fatty acids. These chemicals are toxic at certain levels.

Animals feeding on irradiated food have shown such symptoms as hemorrhages in rats, ruptured hearts in mice and infertility in female dogs.

Adding vitamin K to the diet of the rats cleared up the hemorrhages but Col. Hursh said that more vitamin K was required than laboratory rats are fed in a normal diet.

Tests with mice on the irradiated diet showed that about 80% developed ruptured hearts. The control animals fed the same but non-irradiated diet did not develop ruptured hearts.

After eating irradiated food, some female dogs showed infertility. Tests with these animals are continuing so as to obtain more conclusive evidence.

Col. Hursh said that enzyme changes had also been observed in animals eating irradiated food. The enzymes are either increased or decreased.

For example, cytochrome oxidase was increased in rat livers from animals fed irradiated beef. This increase can be corrected by adding vitamin K to the diet. The close tie-up between cytochrome oxidase and vitamin K was not known before. Such new knowledge has been an important by-product of the animal studies, Col. Hursh said.

He also said that if irradiated foods were fed in any large amount to humans, the foods would have to be fortified with vitamins of all kinds since irradiation decreases the vitamin content in food.

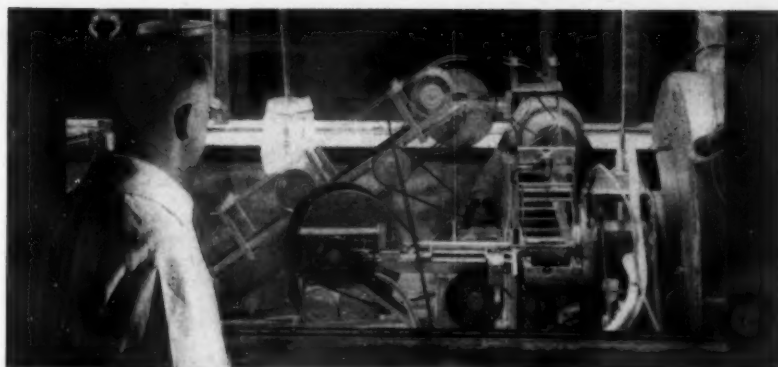
From July, 1960, the Quartermaster Corps will handle only strictly military items. The Atomic Energy Commission will take responsibility for the program of testing irradiated foods for civilians, mostly low-dose irradiated, or pasteurized, food items.

The Army and the AEC will cooperate and exchange information on their progress.

The Quartermaster Corps will have two radiation facilities. One, a cobalt-60 source of 1 mega-curie, being built by the AEC, is the largest in the world. The other is an electron source from a linear accelerator of 24,000,000 electron volts now being constructed.

Until the AEC entered the field, research in irradiated foods was done by private research institutes, universities and the Quartermaster Food and Container Institute for the Armed Forces in Chicago.

Science News Letter, July 2, 1960



**STERILIZATION BY IRRADIATION**—Fuel rods from nuclear power reactors are used to sterilize food in cans banded by a conveyor system. Cans are dropped in front of the entrance hole of tank (right) that contains a field of intense gamma radiation.

#### GENERAL SCIENCE

## Atomic Land Sold at Gain

SALE OF atomic lands has proved a profitable venture for the Federal Government. Especially unusual for the Government, the venture has yielded a net profit approaching a million dollars.

The profit comes as the Government resells land it developed at Oak Ridge, Tenn., and Richland, Wash., communities built around atomic laboratories. Both communities are economically in good health and well on the way to becoming self-sufficient and self-governing municipalities.

The strong financial positions of the atomic age communities are the result of the Community Disposition Program set up by the Atomic Energy Community Act of 1955 and since then operated by the Federal Housing and Home Finance Agency.

Joseph S. Brown, director of the Program, reported to the Subcommittee on Communities of the Joint Committee on Atomic Energy that more than \$42,000,000 has been turned over to the U. S. Treasury from Oak Ridge and Richland real estate sales handled by his agency.

The sales promotion by Federal em-

ployees has been so successful that it has yielded a net profit of \$800,000 for the Government.

Mr. Brown predicted a net total of a million dollars would be accumulated by the time all the property under his jurisdiction is sold.

He recommended minor amendments to the Atomic Energy Communities Act which would permit more flexibility in financing and arranging terms of sale to expedite disposal of remaining properties. Oak Ridge has a greater amount of residential property unsold while Richland has a surplus of commercial land.

The proposed amendments would permit all properties in both communities to be cleared within six months, according to Mr. Brown.

Both in Richland and in Oak Ridge municipal governments and installations, schools, and hospital facilities have been transferred this year to the jurisdiction of the residents under provisions required by the respective states of Washington and Tennessee.

Science News Letter, July 2, 1960

#### CONSERVATION

## Disease Hunts Foxes

AFTER BEING CHASED for centuries by pink-coated huntsmen and trapped, gassed and shot by farmers, the crafty fox is dying from a mysterious disease.

The disease is spreading fast across the country. Foxes are dying in hundreds throughout the English countryside from a virus disease that causes blindness and death in a few hours. Nobody knows where it comes from, but it is known to exist on fur farms in the United States.

Ministry of Agriculture experts estimate that the fox population of the country is very high and that 40,000 are killed each year by hunts, fox destruction

societies and farmers. One hunt can account for 300 foxes in a good season, and there are more than 200 hunting packs in Britain.

Several official and unofficial bodies have started investigations. The Animal Health Trust is carrying out an inquiry on behalf of the Masters of Foxhounds' Associations, while wider probes are being made by the Royal Veterinary College and the Cambridge Veterinary School. The Nature Conservancy has appointed a special officer to make a full scientific record of the outbreak.

Science News Letter, July 2, 1960

# Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

**ADVANCES IN FLUORINE CHEMISTRY, Vol. I—M. Stacey, J. C. Tatlow and A. G. Sharpe, Eds.—Academic, 203 p., illus., \$8.** Reports on research done with halogen fluorides, transition metal fluorides, fluoroboric acids and high-valency metallic fluorides.

**THE APPLICATIONS OF ELLIPTIC FUNCTIONS—Alfred George Greenhill—Dover, 357 p., paper, \$1.75.** Unabridged reprint of work first published in 1892.

**CHEMICAL INSTRUMENTATION: A Systematic Approach to Instrumental Analysis—Howard A. Strobel—Addison-Wesley, 653 p., illus., \$9.75.** Text for course in instrumental analysis on the advanced undergraduate-graduate level.

**CLASSIFICATION OF ELECTRON TUBES—J. Haantjes and H. Carter—Macmillan, 96 p., illus., paper, \$3.50.** Color chart, diagrammatic presentation, cut-away views of typical tubes make this a helpful guide for student and layman.

**CYTOLOGY AND EVOLUTION—E. N. Willmer—Academic, 430 p., illus., \$10.** Textbook stressing the interpretation of observed data drawn from many areas of zoological research.

**DIFFERENTIAL EQUATIONS FOR ENGINEERS—Philip Franklin—Dover, 300 p., paper, \$1.65.** Reprint of book published in 1933 under the title "Differential Equations for Electrical Engineers."

**FACILITIES AND EQUIPMENT FOR SCIENCE AND MATHEMATICS: Requirements and Recommendations of State Departments of Education—W. Edgar Martin—Office of Education (GPO), 130 p., illus., paper, \$1.**

**THE FIRST BOOK OF THE CONGO—Philip McDonnell—Watts, F., 69 p., illus., \$1.95.** Essential facts in simple terms for young readers.

**GENETIC BASIS OF MORPHOLOGICAL VARIATION: An Evaluation and Application of the Twin Study Method—Richard H. Osborne and Frances V. De George, foreword by Th. Dobzhansky—Harvard Univ. Press, 204 p., illus., \$6.** Twin study method applied to the detection of complex genetic variability and to the analysis of genetic-environmental interaction.

**HYPERSONIC FLOW—A. R. Collar and J. Tinkler, Eds.—Academic, 432 p., illus., \$13.50.** Proceedings of the Eleventh Symposium of the Colston Research Society held in the University of Bristol, April, 1959.

**INFRARED RADIATION—Henry L. Hackforth—McGraw, 303 p., illus., \$10.** Discusses principles, sources and optical components of IR, and its application in the sciences, industry and space technology.

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**tion, 38 p., paper, single copies free upon request direct to publisher, 420 Lexington Ave., New York 17, N. Y.**

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**PRINCIPLES UNDERLYING THE INTERPRETATION OF SEISMOGRAMS—Frank Neuman—Coast & Geodetic Survey (GPO), rev. ed., 42 p., charts, paper, \$1.50.**

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**STILLWATER IGNEOUS COMPLEX, MONTANA: A Quantitative Mineralogical Study—H. H. Hess—Geological Soc. of Am., Memoir 80, 230 p., illus., map, \$5.50.** Contains Appendix by J. R. Smith on "Optical Properties of Low-Temperature Plagioclase."

**THE STRUCTURE AND DYNAMICS OF THE PSYCHE—C. G. Jung, transl. by R. F. C. Hull—Pantheon Bks., 596 p., \$6.** Volume 8 of Collected Works, contains "On Psychic Energy" (1928), "On the Nature of the Psyche" (1946), and "Synchronicity: An Acausal Connecting Principle" (1952).

**STYLE GUIDE FOR CHEMISTS—Louis F. and Mary Fieser—Reinhold, 116 p., \$2.95.** Principles of usage, written by chemists for chemists.

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**VITAMIN B<sub>12</sub>—E. Lester Smith—Wiley, 196 p., \$3.** Monograph reviews developments in vitamin B<sub>12</sub> research. Bibliographies include significant papers up to the middle of 1958.

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Science News Letter, July 2, 1960

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## BIOCHEMISTRY

# Progress in Mental Study

DR. LINUS C. PAULING, the Nobel Prize Winner in chemistry in 1954, reported that he is making considerable progress toward understanding the causes of mental deficiencies on a chemical basis.

In investigating the causes of a hereditary type of anemia, he had discovered for the first time evidence of molecular hemoglobin that brought a greater understanding of this disease and indicated that other diseases that plague mankind might be similarly attacked, on a chemical basis. He told SCIENCE SERVICE that he is using this approach with considerable progress toward understanding the causes of mental deficiencies.

His research at the California Institute of Technology, where he teaches, is supported by a Ford Foundation Grant of \$450,000.

Presently, he is focusing on an hereditary mental disease, phenylketonuria, which accounts for one percent of all institutionalized mental defectives.

He also is continuing his work on the nature of molecular structure and chemical bond as they relate to proteins. "I could use \$10,000,000 to support our work on the structure of globular protein. We now have the technology required to find out what we need to know about enzyme catalytic reactions."

Nobody knows how the enzyme works in the body; but it is known that its malfunctioning can be harmful. Dr. Pauling believes that a basic understanding of this most fundamental body reaction can lead to the conquering of most of the diseases and ills that beset mankind.

Science News Letter, July 2, 1960

## MEDICINE

# Marrow Shots for Cancer

HEALTHY BONE MARROW extract injected into cancerous patients may hold the secret of a possible cure for cancer.

Dr. Paul Rosenstein of Rio de Janeiro, formerly a Berlin surgeon, is continuing experiments on animals to follow through on work he began in Germany with cancer patients before political events compelled him to leave.

He writes in the Journal of the International College of Surgeons, June, 1960, that further research is needed, although the influence of young bone marrow upon the growth of cancer seems to be of immense importance.

Dr. Rosenstein is proceeding slowly to build up a sufficient number of results to justify his hopes. In 1933, he says, the Ministry of Propaganda in Germany plagiarized his research, proclaiming a new cure for cancer prematurely and thus ruining for many years all confidence in the investigation he had begun.

Three German cancer patients on whom Dr. Rosenstein tested his extract showed disappearance of malignant tumors after treatment, he reports.

He believes that cancer is due to deficiency brought about by failure of the internal glands to function properly and that perhaps it can result from the fact that "a hormone present in the red bone marrow and consequently only in youth, which influences the proportional growth of the organs, is absent."

In his animal experiments, Dr. Rosenstein removed the marrow from the leg bones of young calves, sheep and goats and demonstrated that in comparison with unoperated animals they remained dwarfs.

Then he injected into mice, rabbits and guinea pigs bone marrow taken from other healthy young animals. Within a few weeks the test animals began to grow faster than normal and soon became giants in their species.

Evidence points to a hormone in the marrow that has some influence on the body's endocrine glands, especially the pituitary gland at the base of the brain.

Science News Letter, July 2, 1960

## PHARMACOLOGY

# Common Drug Found To Be Anti-Convulsant

A COMMON DRUG has been found to possess anti-convulsant properties. The drug may have potential use in the treatment of epileptic seizures, but scientists warned the research to date is not conclusive.

Dr. Eugene Roberts of the City of Hope Medical Center, Duarte, Calif., reported the research at the American Chemical Society's Medicinal Chemistry Symposium in Kingston, R. I.

He said the compound hydroxylamine had been found to help prevent epileptic-like seizures induced in laboratory animals.

At the same time that the compound

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CHAS. PAULSEN

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produced an anti-convulsant effect, Dr. Roberts said, it also raised brain levels of another substance, gamma-aminobutyric acid (GABA).

Dr. Roberts' earlier research had shown GABA to be present only in the brain and in the spinal cord. Later studies by him and others showed that GABA plays a key role in regulating electrical activity in nerve cells, possibly by inhibiting or modulating the transmission of nerve impulses.

"Investigations at the City of Hope and elsewhere have outlined the formation, metabolism and other mechanisms in the biochemistry of GABA with increasing clarity," he said.

The search for a way to raise the brain levels of GABA in normal animals was begun in 1951.

"Many gaps exist in the knowledge of GABA's biochemistry," Dr. Roberts said. "Increasing collaboration between the biochemist, pharmacologist, neurophysiologist and physician will be needed to fill these gaps."

Science News Letter, July 2, 1960

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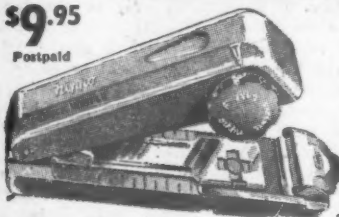


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### TECHNOLOGY

## Welding Process Uses No Solder

### See Front Cover

A COPPER WELDING PROCESS provides better protection against overload, high temperature and dirt for transportation motors by eliminating the use of solder.

The process, using tungsten inert gas (TIG), was announced by General Electric Company for its industrial locomotive motors and generators.

Seen on the cover of this week's SCIENCE NEWS LETTER, a welder applies a tungsten electrode to produce an arc that is shielded by a stream of inert gas. Since the tungsten is not appreciably absorbed by the weld, the joint will be all copper.

Science News Letter, July 2, 1960

## Do You Know

United States farmers now plant 120,000,000 acres of land annually to offset pest losses.

Adding B-complex vitamins and iron to white bread flour is required by law in 27 states.

New Zealanders eat more butter per person than any other people in the world—averaging 43.3 pounds per capita yearly; the United States ranks 13th with 8.6 pounds.

## Questions

GENERAL SCIENCE—What proportion of the money spent for research is provided by the Government? p. 6.

METALLURGY—Where have deposits of columbium are recently been discovered? p. 7.

PUBLIC HEALTH—How much of the total world-wide fallout is still in the stratosphere and how long may we expect it to remain there? p. 2.

Photographs: Cover, General Electric; p. 3, Hughes Tool Company; p. 7, Cornell Aeronautical Laboratory; pp. 10 and 11, U. S. Army; p. 16, W. R. Grace and Co.

## MICRO-ADS

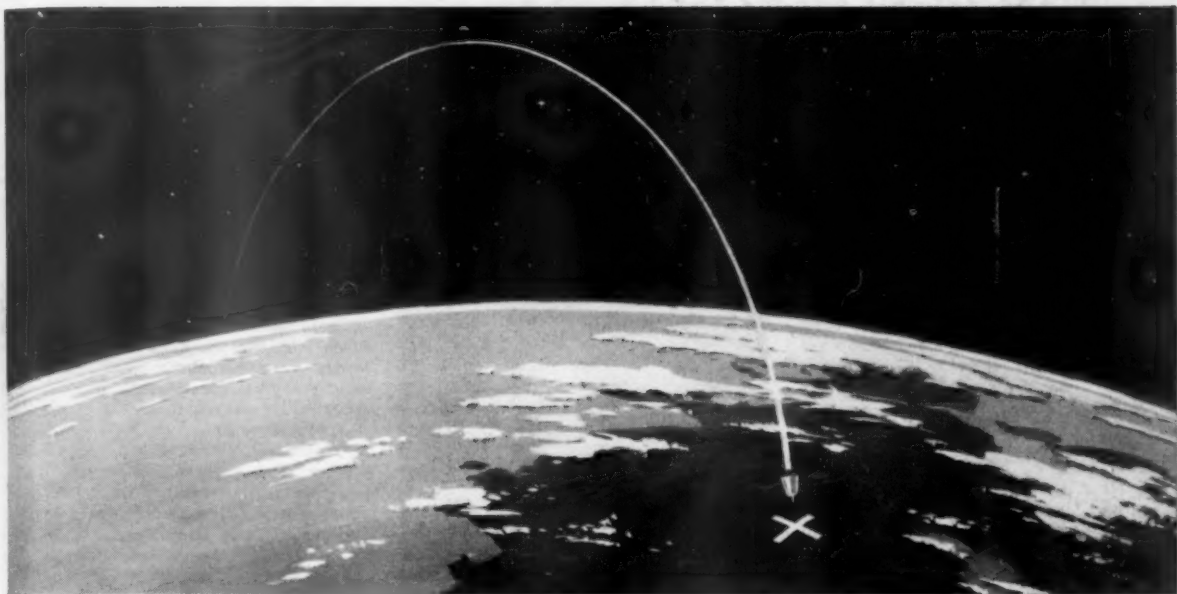
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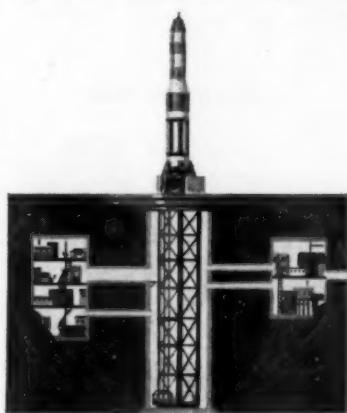
Can you guide a 110-ton Air Force Titan missile far up into the sky, to bring its nuclear warhead down with pinpoint accuracy on a target one-fourth the way around the globe—a target you not only can't see but which continually moves with the spinning earth?

This was the problem in missile guidance the Air Force presented to Bell Telephone Laboratories and its manufacturing partner, Western Electric. The answer was the development of a command guidance system which steers the Titan with high accuracy.

Unlike self-contained systems which demand complex guidance equipment in the missile itself, Bell Laboratories Command Guidance

System keeps its master control equipment on the ground where it can be used over and over again. Thus a minimum of equipment is carried in the missile, and the ground station has full control of the missile during its guided flight. Techniques drawn from the communications art render the system immune to radio jamming.

Bell Laboratories scientists and engineers designed the transmission and switching systems for the world's most versatile telephone network, developed much of our nation's radar, and pioneered in missile systems. From their vast storehouse of knowledge and experience comes the guidance system for the Titan.



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Science News Letter, July 2, 1960

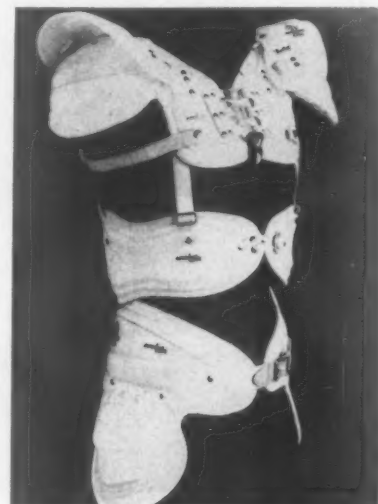
**BIKE "GARAGE,"** a heavy gauge vinyl cover, is especially designed to fit over almost any model of bike and protect it from rain and snow. At the bottom, the cover hooks to the bike's spokes.

Science News Letter, July 2, 1960

**OBSTACLE SIGHTER,** for blind or partially blind persons, is a portable electronic scanning device that transmits a touch "picture" to the user's hand. The range of view is from ground level to well above the head. Power is supplied by standard flashlight batteries.

Science News Letter, July 2, 1960

**PLASTIC FOOTBALL PADDING,** shown in the photograph, is being marketed for the 1960 season. It features increased impact resistance, more flexibility and body conforming. High density poly-



ethylene replaces many fiber parts. Other parts include nylon covering and vinyl padding. The protective equipment resists water and perspiration.

Science News Letter, July 2, 1960

**BANK MATTRESS** has a hidden zipper pocket built into one end. The pocket is 18 inches long and six inches wide, big enough for temporary storage of cash or small valuables. Mattress is available in both full and twin sizes.

Science News Letter, July 2, 1960

**"SOLAR SYSTEM" MAGNETS** do dozens of tricks and may be used to demonstrate the pull of gravity between the earth, moon and sun. Each magnet kit contains three doughnut-shaped magnets, each painted to represent the earth, sun or moon.

Science News Letter, July 2, 1960

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Science News Letter, July 2, 1960

## Nature Ramblings

By HORACE LOFTIN

IT, ALL STARTED with just two white mice. That was all the scientist needed, and the two of them had food and room enough to spare in their little 12-by-12-inch cage. But then one morning, there were 11 mice in that cage—papa, mama and nine tiny hairless young!

For a while, the additions made little difference. But as the young began to grow, father mouse became rather irritable because of cramped quarters and had to be moved out. Meanwhile, though she was still nursing her nine young, it became obvious that mother mouse would soon be a mother again. So as soon as the young were weaned—about two weeks after birth—the mother mouse was placed in the new cage with her mate.

By this time, the nine young mice were no longer tiny, but active half-grown youngsters that ate an amazing amount of food. Their fraternal love was fast being dissolved by lively fights, as the strain of too much "togetherness" began to tell on

Too Many Mice



them. Meanwhile, mother mouse gave birth to a new litter of seven.

Now, instead of two mice comfortably housed and fed in a roomy cage, there were a total of 18 mice competing for food and space in two crowded cages.

At this point, the scientist was forced to play the role of predator, removing 14 of the 18 mice permanently. But in spite of his "predation," the scientist was still two mice ahead, for there were now two mice in each of two cages. All were again well fed and provided with ample living space.

This little incident in the laboratory re-

flects very nicely the situation always found in nature. All animals tend to reproduce at a rate much greater than their environment can support. If all the young of all the wild mice managed to live to reproductive age, soon there would be more mice than blades of grass. This never happens in nature, because there is a natural rigid control over animal numbers.

Just as the scientist was forced to step in and remove the excess mice, so excess numbers are eliminated by predation, disease and starvation.

In nature, the animals of prey usually weed out the weaker and less alert individuals, leaving the hardy few to carry on the race. When, as sometimes happens, populations shoot above normal proportions, the resulting crowded conditions may lead to disease epidemics. In any event, when numbers are too great, starvation inevitably results as the food supply dwindles. This is the natural means of insuring a proper balance of numbers. In this light, the hawk, as a predator, is as necessary to the well-being of mice as is an ample food supply.

Science News Letter, July 2, 1960



## MEDICINE

# DNA May Trigger Cancer

**DNA, the heredity-carrying chemical of some viruses, may change normal cells to cancer cells. Report indicates possibility of chemically destroying the cancer DNA.**

THE LATEST STRATEGY in the war against cancer is to play the deadly game according to the enemy's rules—and beat him at it.

A report released by the Sloan-Kettering Institute for Cancer Research in New York reveals that deoxyribonucleic acid (DNA), the heredity-carrying chemical of some viruses, has been isolated from a cancer-inducing virus and has led to cancers in laboratory animals. Many scientists believe the DNA of the virus, not content to control only its own hereditary factors, either alters or supplements the DNA in body cells.

This change in cellular DNA may trigger the change from normal to cancer. In fact, leukemic blood cells are distinguished from normal white blood cells by characteristic differences in the DNA.

Putting together the newest pieces of information gathered by its own and other research groups, Sloan-Kettering's report indicates that if the cancer DNA can influence normal DNA, it may be possible to turn

the tables and chemically influence or destroy the cancer DNA.

Some of the chemical agents used against cancer appear to do just that—interfere with the cancer cell's manufacture of nucleic acid. Different chemicals may inhibit nucleic acid synthesis at different points in its manufacture.

The Institute also reports that the mechanism by which cancer cells become resistant to chemical treatment by developing new routes of nucleic acid synthesis has now been pinpointed in several instances. But this re-routing problem remains one of the major stumbling blocks in treating the disease with medical agents.

In a slightly different approach, advances in organic chemistry have made it possible to synthesize normal and abnormal components of DNA. It is hoped that the abnormal components will be taken up by cancer cells and will lead to their destruction.

Science News Letter, July 9, 1960

## MEDICINE

# Shoshin Beriberi in U. S.

SHOSHIN BERIBERI, a variety of beriberi which is generally associated with the Orient, is "probably not an uncommon disease in the United States," two Detroit physicians have reported. However, from the few reports on it in the current American medical literature, it apparently is rarely diagnosed.

In the United States, Shoshin beriberi is primarily associated with alcoholic patients, according to Dr. Paul L. Wolf, resident, department of pathology, Wayne State University Affiliated Hospitals, and Dr. Murray B. Levin, resident, department of internal medicine, City of Detroit Receiving Hospital and Wayne State University College of Medicine.

In two instances of Shoshin beriberi described by the doctors in an article in the New England Journal of Medicine, 262:1302, 1960, both victims had foregone food for liquor for a period of days.

In one case, where the disease was recognized and thiamine therapy applied, "the patient made a dramatic recovery."

Failure to diagnose the other case resulted in death five and a half hours after admission to the hospital.

The reporting doctors consider the disease in its alcoholic manifestations "a medical emergency" to which more attention should be given so that diagnosis and treatment may be applied in time to prevent death.

Beriberi is an ancient disease caused by

inadequate diet and resulting vitamin deficiency, particularly of B-1 (thiamine). It was first described in Oriental literature as long ago as 2697 B.C.; but it was not mentioned in Western accounts until 4,000 years later in 1642 A.D.

Shoshin beriberi is characterized by sudden severe heart attack that may result in death within a few hours. It is characterized by shortness of breath, swelling of the ankles, and other symptoms associated with heart ailments. The symptoms of less acute forms of beriberi are extreme lassitude, anemia, muscular atrophy and paralysis. The accepted therapy today for all beriberi is administration of thiamine either orally or intravenously, depending upon the severity of the disease.

Science News Letter, July 9, 1960

## BIOLOGY

# Photosynthesis May Have Electronic Start

NEW EVIDENCE strongly suggests that the first step in photosynthesis, the vital reaction whereby all green plants convert carbon dioxide and water into glucose, may be purely electronic in nature.

Prof. William Arnold and Dr. Roderick K. Clayton, both of the biology division of Oak Ridge National Laboratory in Oak Ridge, Tenn., have studied by spectroscopic

methods the initial changes that take place in the purple bacteria groups when illuminated. They found the change to be the same at temperatures from slightly above room temperature down to nearly absolute zero, which is 459.7 degrees below zero on the Fahrenheit scale. At this latter temperature no ordinary chemical changes can take place. Thus the reaction must be electronic, the scientists reason.

Prof. Arnold and Dr. Clayton report their work in Proceedings of the National Academy of Sciences, 46:769, 1960. Prof. Arnold showed in 1957 that dried chloroplasts—particles containing chlorophyll—act as semiconductors.

As a result of their present research, the Oak Ridge scientists conclude that "the first step in photosynthesis appears to be the separation of an electron and a hole in a chlorophyll semiconductor."

A hole is a missing electron and behaves, in an electrical field, like a positive charge.

The mechanism of photosynthesis is of great practical importance. It could lead to a direct and efficient method of harnessing the energy of the sun for the use of man.

Science News Letter, July 9, 1960

## BOTANY

# Chemical Shortens Stems Of Chrysanthemum

PHOSFON, a relatively inexpensive plant-growth regulator for chrysanthemums, shortens the mums' stems so that plants require less room in greenhouses and no staking. Tests by the U. S. Department of Agriculture at Beltsville, Md., show the size of flowers on the treated plants is not notably affected by the chemical. Phosfon went on sale at most seed houses on July 1.

Science News Letter, July 9, 1960



**SHORTER CHRYSANTHEMUMS**  
—A chemical, Phosfon-D, reducing the height of chrysanthemums, has been introduced by the Virginia-Carolina Chemical Corporation, Richmond, Va. The plant at right was treated with Phosfon; the plant at left was not.

## MEDICINE

# Tells of Asthma Treatment

MRS. EISENHOWER'S recent attack of acute bronchial asthma has focused national attention on this ailment.

Asthma is no respecter of either age, social or economic status. Infants as well as octogenarians may have asthma. However, it is more prevalent in those under fifteen and in age groups from 25 to 44. Less than half of the 8,000,000 asthma sufferers in the United States receive treatment from a physician.

Too often, particularly among the low-income groups, treatment is limited to purchase of advertised cure-alls.

The three-week period of hospitalization for Mrs. Eisenhower is not exceptional but is in keeping with accepted medical treatment for patients with an asthma severe enough to indicate hospitalization.

While not necessarily dangerous in a fatal sense, the type of attack which would prompt hospitalization is generally so severe that the patient cannot easily eat or drink because of difficulty in breathing. Status asthmaticus is the medical term for an attack of this sort.

"A patient with status asthmaticus gasps for breath as though he had run a mile on a tread-mill. It is both painful and frightening," Col. Harold E. Ratcliffe, chief of the Allergy Clinic at Walter Reed Army Hospital, Washington, D. C., reported.

The first thing that is done for such a patient is to administer medication which will relax the bronchial muscles and allow more normal breathing. After the patient is relieved, the doctors begin a thorough examination which may include chest and nose X-rays as well as routine check of heart functioning, pulse rate, blood pressure, and other areas necessary for a full picture of the general physical condition. A history of the patient's previous asthma attacks is of prime importance in prescribing treatment.

If the asthma appears to stem from an allergic or sensitive condition, skin tests may be advised. But under any circumstances, these are secondary to the general examination and history.

"We think of asthma, not as a disease, but as a symptom or manifestation of an illness or disease just as congestive heart failure may be due to causes other than diseases of the heart itself," explained Col. Ratcliffe.

Perhaps the most prevalent cause of asthma is allergy or sensitivity. Col. Ratcliffe describes the allergic patient as one who has "harmful reactions to harmless substances." These can be such substances as eggs, milk, feathers, house dust, grasses or other pollens.

Another big group of asthma sufferers are those sensitive to infections such as those that cause colds or sinus congestions. Quite commonly both the allergic and infectious sensitivity may be combined.

Col. Ratcliffe debunked the theory that asthma may be the result of anxiety.

"Purely psychogenic asthma," he said, "is very unusual. I would say, it is rare." However, he did emphasize that stress or anxiety may intensify an asthma attack, although it may not initiate one.

The basic treatment of asthma is often very simple once you have determined what is causing it, according to the Walter Reed specialist. "Remove the object or substance to which you are sensitive from your environment," he advises.

Col. Ratcliffe observed that in the event of a sensitivity to pollen, grasses, or house dust, this may not be feasible. Here he suggests hyposensitization. This is the injecting under the skin of an extract of the substance to which the patient is allergic until the patient develops an immunity to it.

However, such extensive treatment as required by hyposensitization is not necessary if the allergic asthmatic patient responds well to any of the anti-histamines or asthma medications recommended by a reputable physician.

There is no known cure for asthma, but it can be effectively treated and controlled so that the asthmatic can lead a very normal and useful life.

Science News Letter, July 9, 1960

## MEDICINE

## Smoking, Heart Disease Linked in Studies

A POSSIBLE relationship between heavy cigarette smoking and coronary heart disease is indicated but not proved in a new report by the American Heart Association in New York.

Studies of middle-aged men show that death rates from heart attacks were from 50% to 150% higher among heavy smokers than among those who do not smoke cigarettes.

Further study is needed to prove that the statistical facts are sufficient evidence and also to determine the effects of smoking on other aspects of heart disease, the Association says.

Science News Letter, July 9, 1960

## MEDICINE

## Lab Boasts Monkey Floor, Unique Air Conditioning

BUILDING 29, a new \$3,500,000 structure of the National Institutes of Health in Bethesda, Md., boasts a unique air-conditioning system that assures triple-filtered air which is not recirculated throughout the building.

Building 29 is designed for NIH's Division of Biologics Standards which is responsible for the control of biological products such as vaccines and serums sold in the United States.

Because many of these products are derived from living organisms, such as bac-

teria and viruses, and because all by their nature are potentially dangerous, close surveillance of production and constant improvement in quality is essential.

The building's sterile rooms are stainless steel chambers. One is even equipped with an exhaust that incinerates the air as a safety precaution.

Twelve thousand square feet of laboratory space on the first four floors will house bacteriology, virology, rickettsiology, immunology, chemistry and hematology laboratories.

Monkeys take over the fifth floor where doctors and laboratory technicians will use them to test vaccines. This area will have its own private elevator.

Science News Letter, July 9, 1960

## SCIENCE NEWS LETTER

VOL. 78 JULY 9, 1960 NO. 2

Edited by WATSON DAVIS

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N.W., Washington 6, D. C., NORTON 7-2255. Cable Address: SCIENSERV.

Subscription rates: 1 yr., \$3.50; 2 yrs., \$10.00; 3 yrs., \$14.50; ten or more copies in one package to R. Brode, National Bureau of Standards, Douglas copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

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Printed in U.S.A. Second class postage paid at Washington, D. C. Established in mimeograph form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index. Member Audit Bureau of Circulation.

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The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

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## METEOROLOGY

# National Weather Center

A NATIONAL CENTER of atmospheric research will be established by the National Science Foundation in Washington, D. C., to conduct and stimulate basic research on weather.

Dr. Alan T. Waterman, director of the Foundation, said the center will collaborate and cooperate with university groups now involved in research and will coordinate several such units for the purpose of conducting large-scale projects in the atmospheric sciences.

The major portion of the research will remain with the universities; and the center may operate from several locations, as yet undetermined. No headquarters have been established to date.

Center research programs will include studies concerned with atmospheric motions, energy exchange processes in the atmosphere, water content of the atmosphere and physical phenomena in the atmosphere.

A year of investigation and exploratory work will probably precede any decision involving the undertaking of long-term research projects.

Dr. Walter Orr Roberts, director of the High Altitude Observatory, Boulder, Colo., has been appointed director of the national center.

The Foundation has a \$500,000 con-

tract with the University Corporation on Atmospheric Research (UCAR), to set up and establish the center. UCAR also will provide management for what is expected to become a large and widely dispersed research effort.

Dr. Waterman said, "The atmospheric sciences have suffered from neglect and lack of trained research personnel. Walter Roberts and the research group he forms will be able to lead the way in overcoming these problems."

The USSR already has established two central institutions for atmospheric research. Additionally, it has provided central installations and equipment for this important scientific field.

Science News Letter, July 9, 1960

## TECHNOLOGY

## Stretch Paper Promises Throw-Away Clothes

A PAPER that stretches in all directions is being boosted for use as disposable bed-sheets, diapers, draperies, slipcovers, sterile medical gowns, nurses' and barbers' uniforms and similar products.

The all-way-stretch paper developed from research work with a commercially sold

paper that stretches lengthwise. The new paper is now "halfway between pilot production and actual commercial manufacture," reports Gerald E. Amerman, president of Clupak, Inc., the New York firm holding the stretch-paper patent.

Mr. Amerman said experiments indicate that even a practical leather substitute might be developed using a combination of extensible heavyweight paper and resins.

Production of the older paper involves pressing together the fibers in a wet sheet of paper between a rubber blanket and a heated, polished cylinder. The new paper is made by controlling the recoil of the rubber blanket so the paper sheet is compressed in all directions, not just lengthwise.

Science News Letter, July 9, 1960

## ROCKETS AND MISSILES

## Radar System Can Recover Spaceships

A GROUND-BASED radar system for guiding and landing aircraft by remote control has been developed by the Sperry Phoenix Company, Phoenix, Ariz. The microwave aerospace navigation (MAN) system can command and control direction and speed of the aircraft through an earth-bound controller operating the MAN unit from a specially constructed highway van. MAN will literally "fly" aircraft from the ground.

Sperry engineer-scientists believe MAN may prove ideal for testing of nuclear-powered aircraft capable of cruising aloft for weeks or months. Managing such flights for such periods would be difficult for men confined inside the ships. It would be easy and effortless for the MAN system.

Science News Letter, July 9, 1960

## ASTRONAUTICS

## New Re-entry Solution: "Ballute" Drag Balloons

A NEW SOLUTION to the re-entry problems of space vehicles—giant, pop-up balloons—has been developed by the Goodyear Aircraft Corporation, Akron, Ohio.

The balloons are designed to stabilize and slow down nose cones and manned capsules as they re-enter the upper atmosphere. By reducing the speed of re-entry, a drag balloon can reduce the amount of heat caused by friction with the atmosphere and save a space vehicle from burning up.

Company engineers call the drag balloons "Ballutes." In the proposed slowing of the vehicle, a parachute ejected at lower altitudes is also used.

A Ballute nine feet in diameter will be evaluated this summer with a Cree test missile. The Ballute inflates in a tenth of a second. It will be deployed behind the Cree missile for stabilization.

Once the missile is stabilized, the balloon will be reeled out to slow re-entry.

The Ballute is made of coated fabric. It has already been tested at two centers of the National Aeronautics and Space Administration, Langley Research Center at Hampton, Va., and Lewis Research Center in Cleveland, Ohio.

Science News Letter, July 9, 1960



**POP-UP BALLUTE**—Capable of inflating in a tenth of a second, this drag balloon, called a "Ballute," can control high-speed deceleration of re-entry vehicles. James C. Bell, Jr., Goodyear Aircraft Corporation development engineer, inspects the nine-foot-diameter balloon.



## MEDICINE

# Mental Deficiency in Twins

A CHILD born as a twin has a greater than usual chance of being mentally defective, a study reported in London indicates.

Drs. J. M. Berg and Brian H. Kirman, Fountain Hospital, London, found that among 1,390 mental defectives receiving care in the home or in institutions in the London area, about 6.4% were members of twin pairs. Twins make up only about 2.1% of the general population.

The study also showed:

The twin born last is more often mentally defective; 61% of the mentally defective twins were second-born. The second born are also more frequently the victims of stillbirth.

Whether twins or singletons, mentally defective babies usually had a lower-than-usual birth weight. Two-thirds of these defectives studied had additional physical abnormalities. These ranged from a small head to heart defects and deformed feet.

In one way, twins are the luckier group.

Mongolism, a deformity usually accompanied by idiocy, is six times more common among singletons.

The reason for the higher incidence of mental deficiencies among twins, ranging from idiocy to subnormal learning ability, is unknown. In autopsies on nine twins who died during the study, there were no gross brain malformations indicating that something had gone wrong in embryonic life. The brains did show pathological changes that appeared to be the result of damage late in pregnancy, at birth or shortly after birth.

The doctors, reporting in the British Medical Journal, June 25, 1960, pointed out that the greater risk in multiple births is indicated in a stillbirth-rate comparison. For all births there are 23 stillbirths per 1,000 births. In twins the rate is 53 per 1,000.

Science News Letter, July 9, 1960

## MEDICINE

# Guiding Heart Patients

ELECTRONIC COMPUTING and measuring equipment is providing new guides to the amount of work a heart patient may safely perform, Dr. William G. Kudicek, director of research at the University of Minnesota Medical School's department of physical medicine and rehabilitation, reported.

A pioneer in medical electronics, Dr. Kudicek said, "The machines provide for the first time an easy-to-read recording of the complicated interrelationship of physiological functions as they relate to the heart. With them we can examine a heart patient in light exercise, for example, and see at almost a glance just when the danger point of exertion has been reached."

Thanks to electronics, he said, it may be possible to return heart patients to useful work under accurately determined limits.

"With electronic aids, a heart patient can be thoroughly examined in a matter of hours, while, at the same time, the measurements of the physiological responses that relate to the functioning of the heart are mechanically recorded and averaged."

A trained technician needs two to three days to average the same measurements.

The machine that provides the simultaneous computations is called an analog-to-digital converter. It assesses measurements of the patient's oxygen consumption, pulse rate, blood pressure, respiratory volume, energy output, and other responses as they are taken and records the results on a tape for quick, easy analysis.

The analog-to-digital converter is an innovation being used medically for the first time by Dr. Kudicek and his staff. Their research is sponsored by the Office of Vocational Rehabilitation of the National Institutes of Health.

The project is aimed at providing new guide lines for physicians to assess the working abilities of patients with heart disease. Dr. Kudicek was interviewed in Washington, D. C., before a meeting with Sen. Hubert H. Humphrey (D-Minn.), chairman of the Senate Subcommittee on Reorganization and International Organization, concerned with medical research and assistance and related studies.

One of the Senator's pet projects is medical electronics; he has been active in promoting this development as an aid both to medical research and practice.

Science News Letter, July 9, 1960

## ASTRONOMY

# Two Comets, Supernova Now Roaming the Skies

THE COMET FINLAY, expected to brighten enough this summer to be observed with moderate size telescopes, has just been rediscovered for the first time since its disappearance in 1954.

This comet was rediscovered by Robert Burnham of Prescott, Ariz. The Finley comet appears only every seven years.

It was originally discovered in 1886. Since then it has been observed in 1893, 1906, 1919, 1926 and 1953-54. It was not seen in 1933, 1940 and 1947.

The comet is now in the constellation of Aquarius in the morning sky. However, it is of 17th magnitude and only a photographic object.

It is expected to brighten to tenth magnitude by August. By that time it will be in the constellation Taurus and should be bright enough to be seen with a moderate-sized, amateur telescope.

Discoveries of a new comet and a supernova have also been reported by Dr. M. L. Humason of Mt. Wilson and Mt. Palomar Observatories. The comet is of 17th magnitude. It is not known if it will brighten. It is located in the constellation of Hercules.

The supernova was of 14th magnitude when discovered. A nova is a star that suddenly increases in brightness and then dims down again. A supernova is about 100 times as bright as a nova.

News of the comet Finlay, discovered at 5:02 a.m. (EDT) June 21, and the comet and supernova, discovered respectively on June 18th and 17th, was reported by Harvard College Observatory, clearing house for astronomical information in the Western Hemisphere.

Science News Letter, July 9, 1960

## BOTANY

# Botany Department to Set Up Fungus Center

THE DARTMOUTH COLLEGE botany department will establish a national center for supplying fungi for teaching and research. Between 1,000 and 2,000 genetic strains of the fungi *Neurospora* and *Aspergillus* will be collected and maintained. They will be supplied free of charge to scientists and teachers. The center will be financed by a \$32,300 grant from the National Science Foundation.

Science News Letter, July 9, 1960

## AGRICULTURE

# New Soft-Rot Found on Corn

A NEW SOFT-ROT, discovered on a farm near the Wisconsin River and in other localities in Wisconsin, Maryland and the Carolinas, is now under study.

The soft-rot kills corn plants by attacking the stems, so that they eventually break and the plants fall to the ground. Losses due to the disease on the farm where it was discovered amounted to about 10% of the crop.

Research scientists at the University of Wisconsin, Madison, Wis., have discovered that the cause of the disease is a bacterium of the coliform group, which appears to be introduced in overhead spray irrigation. The soft-rot occurs only when river or stream water is sprayed on the plants from above and not when the same water is used in furrow irrigation. No traces of the disease have been reported where artesian water is used in irrigation.

Science News Letter, July 9, 1960

## AGRICULTURE

# New Hampshire First Brucellosis-Free State

NEW HAMPSHIRE has been declared the first brucellosis-free state in the Union by the U. S. Department of Agriculture. Freedom from brucellosis, or undulant fever, was proved by testing all cattle herds. The state also showed that there were no reports of brucellosis in domestic animals.

Science News Letter, July 9, 1960

## PHYSICS

# Experiments on Neutrinos

ELEVEN NEW EXPERIMENTS that could help determine the real nature of the atomic "ghost" particle called the neutrino are suggested by the ex-British physicist who lives near Moscow, Dr. Bruno Pontecorvo.

Italian-born Pontecorvo, who fled from England to Russia in 1950, is now a Soviet citizen, has won a Stalin Prize and is a member of the USSR Academy of Sciences. He is considered one of Russia's top physicists, and works at the Joint Institute for Nuclear Research less than a hundred miles from Moscow.

Dr. Pontecorvo's suggested experiments are reported in Soviet Physics JETP 37(10), 1236, 1960, a translation of the Journal of Experimental and Theoretical Physics published by the American Institute of Physics. He lists 16 ways in which the reactions of free neutrinos could be determined in large atom-smashing machines. Five of the methods have previously been investigated either experimentally or theoretically.

The neutrino is uncharged, has a vanishingly small mass, and has been found to spiral in a left-handed manner. The elusive neutrino occurs when certain radioactive nuclei disintegrate radioactively. It is then spinning in a direction such as is

described by a left-handed screw, meaning that it is spinning counter-clockwise when moving away from the observer. Its spin direction, together with its direction of motion, define a left-handedness or right-handedness.

The discovery that there is a distinction between left-handedness and right-handedness in nature under certain conditions—known as the non-conservation of parity—won the Nobel Prize in Physics for the United States physicists, Drs. T. D. Lee and C. N. Yang, now of the Institute for Advanced Study, Princeton, N. J.

Dr. Pontecorvo points out that, although the experiments he suggests may not be possible today, they could be done in particle accelerators producing more intense beams of mesons than now available.

Science News Letter, July 9, 1960

## PHYSICS

## New Theory Extends Relativity to Particles

A PHYSICIST in New York proposed a new theory extending the theory of relativity to account for the internal structure of such elementary particles as electrons and protons.

In his theory, a part of which will be published later in Physical Review, the scientist argued that a particle moving from one point to another in an electromagnetic field undergoes changes in its dimensions.

The theory is the product of Dr. Lloyd Motz, an associate professor of astronomy at Columbia University. He is the author of "This Is Astronomy" and "Outer Space."

Dr. Motz said modern physicists have treated the particles as points that do not change dimensions. He believes they are wrong.

His theory, he said, shows how an electron is held together and accounts for the capture of light by the electron.

Dr. Motz has demonstrated that, by making certain assumptions about the way in which the dimensions of the particle can alter when it moves in various paths, several of the well-tried, older equations that govern the properties of particles may be derived.

He has shown, for example, that the second order Dirac equation, a fundamental equation in modern wave mechanics, can be derived from his theory.

Science News Letter, July 9, 1960

## PHYSICS

## Experiment to Duplicate Energy Source of Sun

See Front Cover

THREE HUNDRED CONDENSERS, a section of a power supply with a discharge of electrical energy totalling 100 billion watts, are being used in research to find a way to duplicate the energy source of the sun.

Sponsored by General Dynamics Corporation's General Atomic Division and the Texas Atomic Energy Research Foundation at John Jay Hopkins Laboratory for Pure and Applied Science, San Diego, Calif., this research is aimed at achieving a power source from nuclear fusion. Some of the clamps tying the condensers together are shown on the cover of this week's SCIENCE NEWS LETTER.

Science News Letter, July 9, 1960

## METALLURGY

## Alloy Will Increase Use of Alumina

AN ALLOY with similar heat expansion properties as alumina, a ceramic of great potential in the electronics industry, has been developed.

The advent of the inexpensive and easily fabricated alloy, called Fernico-5, will make alumina more useful in such things as electron tubes, thermionic energy converters and high temperature circuits, all of which require metal-to-ceramic seals.

Fernico-5 is an alloy of iron, nickel and cobalt in undisclosed proportions. It was developed at the General Electric Research Laboratory in Schenectady, N. Y.

Ceramics made of alumina, the oxide of aluminum, have excellent properties as insulators in the electronics industry.

Science News Letter, July 9, 1960



**RIDING ON AIR**—The Curtiss Wright Air Car rides on a "cushion" of air that is directed straight down to the ground by a urethane skirt, a highly abrasion-resistant material. The United States Rubber Co. developed the skirt, which also protects the vehicle's undersurface.

## NUTRITION

## Vitamins A and C Low In Average U. S. Diets

THE AVERAGE DIET is most often low in vitamins A and C, calcium and iron, Dr. Agnes Fay Morgan, professor emerita of the University of California, Berkeley, told delegates to the American Home Economics Association meeting in Denver, Colo.

She said increased consumption of certain fruits, vegetables and nonfat milk solids might remedy the lack.

The California Agricultural Experiment Station scientist studied the eating habits of more than 12,000 persons in four parts of the United States from 1947 to 1959. The nutritional status of the American people was found to be generally good.

Science News Letter, July 9, 1960

## MEDICINE

## Monkeys' Mosquitoes Transmit Malaria to Man

THE FIRST evidence that monkey malaria can be transmitted to man by the bite of an infected mosquito was reported by Public Health Service scientists at the National Institutes of Health, Bethesda, Md.

The success of the experiments directly challenges the general concept that malaria cannot be transmitted from animal to man by the mosquito.

The study originated from accidental infections involving a doctor and an assistant at the Institutes' Memphis, Tenn., laboratory. Dr. Don E. Eyles was working on large-scale inoculations of monkeys with primate malaria when he and his assistant developed illness with fever.

Neither had been in contact with human malaria, but malaria parasites were demonstrated to be in their blood.

The two accidental infections were followed by two planned infections with volunteers from the staff. Both came down with malaria from which they recovered.

The experiments are reported in Science, 131:1812, 1960, by Drs. Eyles, G. Robert Coatney and Morton E. Getz, all of the Laboratory of Parasite Chemotherapy, National Institute of Allergy and Infectious Diseases.

Science News Letter, July 9, 1960

## AGRICULTURE

## Sowing Wild Oats Improves Breed

SOWING WILD OATS is highly approved by the U. S. Department of Agriculture, if the wild oats are the Saia variety. These are oats that offer life-long resistance to crown rusts, stem rust, smut and other fungus diseases of oats that have plagued oat growers in the major producing areas of the world, including the United States.

Experiments to transfer Saia's resistance to the more cultivated, domesticated varieties have been conducted with promising success by Drs. K. Sadanaga and Marr D. Simons of USDA's Agricultural Research

Service working with the Iowa Agricultural Experiment Station.

The wild oat's desirable resistant qualities were successfully transferred to an intermediate species, Aberdeen 101. Aberdeen 101, the "genetic lucky break" that resulted some years back from crossing wild oat Saia and an intermediate oat, has Saia's gene resistance as well as the characteristics of the semi-cultivated variety.

In 1957, when rare crown rusts broke out, Saia's resistance to them was discovered. Aberdeen 101 was happily available for crossing with fully cultivated oats. The results, after crossing and backcrossing, resulted in progeny that display the good characteristics of the cultivated parents with Saia's resistance.

Science News Letter, July 9, 1960

## PUBLIC HEALTH

## Polio Cases Increase, Called Class Disease

A SHARP INCREASE in the number of polio cases has been reported by the Public Health Service, where a PHS official said the cases indicate polio has become a kind of class disease.

He said the lower socio-economic classes are not being reached by the Salk vaccine. "The only way to get the unvaccinated groups to protect themselves is through the visiting nurse associations and similar group guidance," he added.

In certain parts of the country polio has been rising since May. Thirty-seven polio cases, 30 of them paralytic, were reported in the United States during the last week on which figures are available, that ending June 18. The week before only 19 were reported, with 16 of them paralytic.

The 30 paralytic cases are below the number reported in the same week in 1959, but above the comparable 1958 week. Twelve of 13 cases in California were paralytic. Polio is expected to reach its peak in August or September.

Science News Letter, July 9, 1960

## HOME ECONOMICS

## Predict Irradiated Foods On Sale by 1970

IRRADIATED FOODS will be common in the supermarkets of 1970, it was predicted by the head of the department of home and family life of Teachers College, Columbia University.

Dr. Floride Moore told the American Home Economics Association meeting in Denver, Colo., that those who attend the 1970 AHEA convention will casually discuss the quality of irradiated foods picked up at market. She said the care of ultrasonic dishwashers may be another topic of conversation.

Dr. Moore predicted physicians would learn to treat cardiovascular diseases, cancer and mental illness as well as they have learned to control polio. She said that by 1970 they will also have "gained new understandings of the aging process, and significant advances will have been made in the field of geriatrics."

Science News Letter, July 9, 1960

# IN SCIENCE

## INVENTION

## Machine Harvests Irish Moss

SEAWEEDS are difficult to harvest and Irish moss particularly so. The alga grows to about three to five inches in length and normally attaches itself to rocky, uneven sea bottoms. Up to now, these plants had to be harvested by hand. Earl C. Jertson of Fairhaven, Mass., has now invented a machine capable of detaching large quantities of Irish moss from the sea floor and bringing it to the surface. It was awarded patent No. 2,941,344.

In essence, the device consists of an endless chain, similar to a rope ladder in shape. Rakes are attached to each of the "rungs" so they point along the chain. The ladder arrangement is fed out from one end of a boat and in at the other. The flexible rake-ladder follows the contours of the sea floor and catches the plants to be harvested.

The Irish moss is torn off the rocks and carried up to the boat where it is removed while the rakes are protected from all but the smallest rocks by the sides of the chain. Mr. Jertson assigned his patent to Marine Colloid, Inc., of Delaware.

Science News Letter, July 9, 1960

## AGRICULTURE

## Blood Spots in Eggs May Be Due to Chemicals

AN INCREASE in eggs with blood spots may be due to hens' picking up chemicals intended for rodents, Paul E. Sanford, poultry chemist at the Kansas State University, Manhattan, Kans., has reported.

He said another cause of the spots may be rations low in vitamin K. On a candled basis a one percent to two percent loss should be expected from blood spots, the scientist says, but if the grading loss runs much higher than two percent, a poultryman must become concerned.

Science News Letter, July 9, 1960

## MEDICINE

## Miscarriages, Mongolism Linked in British Study

MISCARRIAGES and mongolism are linked in a study. Drs. Alec Coppen and Valerie Cowie, both of Maudsley Hospital, London, studied 55 mothers of mongols (children malformed at birth and often imbeciles) and found "an extremely high rate of miscarriage."

Fifteen of the mothers had had one miscarriage, seven had had two, and three had had three or more.

Drs. Coppen and Cowie reported their study in the British Medical Journal, June 18, 1960.

Science News Letter, July 9, 1960



# THE FIELDS

## AGRICULTURE

### Control Foreseen for Wheat Smut Fungus

WHEAT SMUT, a fungus disease that could cost United States wheat growers many millions of dollars a year, is expected to be brought under chemical control.

Dr. Vernon H. Chelidelin of Oregon State College told an American Chemical Society meeting in Richland, Wash., that a substance believed responsible for the dwarfing of wheat, one of the first symptoms of the disease, has been identified. The substance is a natural product of a smut fungus called *Tilletia contraversa*.

The material, oxalic acid, is capable of removing from wheat tissue nutrients that are essential to growth, Dr. Chelidelin said.

Research on the life process of smut fungi is expected to reveal information on the nature of the parasites and on the resistance of wheat to them. This insight may lead to logical control methods, Dr. Chelidelin reported.

The only defense against wheat smut at present is to breed resistant strains of wheat. However, smut fungi can, by interbreeding or mutation, produce new races capable of attacking the "resistant" wheat.

Wheat smut, which seriously limits the wheat crop in the northwestern states and threatens to spread to every wheat center in the world, shows up as black spores that replace the wheat kernels.

Dr. Chelidelin said that it is still necessary to prove that oxalic acid is toxic to the wheat plant. He suggested that the plant possesses a mechanism for detoxifying the acid, or that only smut-resistant plants have this capacity.

E. J. Vaisey and Dr. R. W. Newburgh, also of Oregon State College, were co-authors of the report.

Science News Letter, July 9, 1960

## GEOLOGY

### "Star Dust" Contains Rare Material, Coesite

THE "STAR DUST" sold in souvenir bottles at the meteor crater near Canyon Diablo in Arizona contains a rare material, coesite.

Previously, coesite was made only in small quantities in laboratories, by squeezing silicon dioxide, common quartz, under extremely high pressures. The discovery that coesite occurs naturally under high pressures was made by Edward Chao of the U. S. Geological Survey.

If the moon's craters were also made by the impact of meteors, as many scientists believe, then chances are good there are diamonds on the moon. The diamonds would be produced under the extremely high pressures generated when meteors smashed into the lunar surface. The high pressures cause crystalline changes, such as

occur when graphite is changed to diamond or quartz to coesite.

Except for meteor craters and small laboratory quantities, coesite is believed to exist on earth only at depths below 40 miles.

Geologists believe that coesite might be discovered on the earth's surface if a careful search were made. This would mean that the rocks in which coesite was found had been carried from great depths to the surface in times long past.

Scientists at both the Carnegie Institution of Washington and the University of California at Los Angeles, among others, have prepared coesite in the laboratory. They have instruments that duplicate conditions under which rare materials are formed at extreme depths.

Science News Letter, July 9, 1960

## INVENTION

### New-Type "Parachute" Works Like Autogyro

PERHAPS THE FIRST really new device invented for slowing one's fall from aircraft and high buildings since people started using parachutes won patent No. 2,941,763 for Dimitrij Oleksij of East Orange, N. J.

Mr. Oleksij sees numerous disadvantages in the conventional type of parachute used today. It is difficult, and often impossible, to control the direction of one's fall. Troops are sometimes carried behind enemy lines.

Parachutes also require a considerable time to open and are thus limited to high jumps. In military operations conventional parachutes are visible from a great distance.

The new invention is said to eliminate these disadvantages. It consists of two autogyro-like rotors mounted one above the other on a central cylindrical column. In descent, the rotors will turn in opposite directions. Therefore, there will be no over-all rotation of the device.

Extending from the bottom of the column there is a bar and on the other end of the bar a "T piece" on which the user sits. Attached to the outside of the upper column below the rotors are a safety strap which loops around the user's body and a rigid handle with which the user may tilt the rotor column relative to the seat and thus steer his descent.

When not in use, the seat bar is thrust up inside the upper column and the rotor blades fold down next to the column to make a conveniently sized pack.

Science News Letter, July 9, 1960

## ROCKETS AND MISSILES

### Largest Hydrogen Rocket Engine Fired

FIRING TESTS of the largest liquid hydrogen-liquid oxygen pump fed rocket engine in the free world have been completed successfully, Aerojet-General Corporation, Azusa, Calif., announced. Designed to produce 200,000 pounds of thrust in space, the experimental device is the first big engine to burn liquid hydrogen.

Science News Letter, July 9, 1960

## DENTISTRY

### Adults' Crooked Teeth Helped by Headgear

ADULTS' CROOKED TEETH can be straightened by a special headgear appliance worn only at night.

Dr. Sanford N. Kingsly, a Brooklyn, N.Y., orthodontist, reports in the Journal of the American Dental Association, July 1, 1960, that age is no longer the determining factor in teeth-straightening treatment. He has treated adults from 25 to 48 years of age successfully.

Dr. Kingsly says in treating adults special headgear for use at night is often recommended so that the patient will not have to wear noticeable bands during daytime activities.

Appearance is especially important, he emphasizes, in the case of careerists such as television performers.

He tells of an actress who had been trying to hide her teeth. After 20 months the headgear treatment of 12 hours out of the 24 proved successful.

"An improved facial appearance had an extremely beneficial effect on the personality of the young lady."

Science News Letter, July 9, 1960

## PUBLIC SAFETY

### Children's Mimicry Leads to Poisoning

PARENTS SHOULD swallow their pills out of sight of their children, Dr. Alfred J. R. Koumans of Norwalk, Conn., reports in Pediatrics, published by the American Academy of Pediatrics. He said that in a study he made, 67% of the children under five poisoned by taking excessive doses of medicine were mimicking parents. His study showed that the drive to imitate leads children to climb up to reach bottles or packages of pills.

Science News Letter, July 9, 1960

## HOME ECONOMICS

### Food Specialist Praises Convenient Foods

YOUNG HOMEMAKERS have guilt feelings over buying foods in more convenient forms than those used by their mothers, Mrs. Jeannette Lynch, food marketing specialist with the Colorado Extension Service, told the American Home Economics Association meeting in Denver, Colo. She said a food distributor's survey on motivations and values revealed the feelings.

But she said a comparison of the nutritive value, the quality and the preparation time of convenience foods with ordinary forms of the same foods may help eliminate such guilt feelings.

She reported the research during a panel shared by Virginia Smith, Extension supervisor, Kansas Extension Service, and Mrs. Ella Anderson, home demonstration agent, Virginia Extension Service.

Science News Letter, July 9, 1960

## MEDICINE

# Battle Over Experimental Animals

A proposed Senate bill has stirred up controversy over humane treatment of laboratory animals used for research. Scientists and animal care groups prepare for the big battle.

By GLORIA BALL

THE STARTING GUN for what "might become the biggest antivivisection fight in ten years" has been fired.

At present the hot spot is Washington, where a humane experimental animal treatment act was placed before the Senate Labor and Public Welfare Committee on May 18. Sponsors include 11 senators led by Sen. John Sherman Cooper (R-Ky.) who championed humane slaughter of food animals in a bill approved by the 85th Congress.

The present Cooper bill provides in general terms for housing, treatment and disposal of laboratory animals used by persons receiving Federal grants. Qualified applications with proper animal facilities would receive a "certificate of compliance" from the Secretary of Health, Education and Welfare. No grant would be made and no experiment could be conducted unless a project plan was filed with the Secretary.

Annual reports to the Secretary would include the numbers of animals used and a record of their disposal. All animals on whom students had practiced surgery would be killed before being allowed to recover consciousness.

Authorized representatives of the Secretary would be assigned police powers, would have access to all grantee's laboratories and records and could order the destruction of animals if they saw fit.

## Scientists Denounce Bill

Sen. Stuart Symington (D-Mo.) has declined sponsorship of the Cooper bill, because he believed the scientific community would not be happy with it. He could not have been more correct.

In a strongly worded denunciation, the National Society for Medical Research, backed by 500 scientific organizations including every medical college in the United States, said:

"The Cooper bill is identical in its major provisions to the German law . . . which so encumbered animal experimentation that it was cited at the Nuremberg trials as one reason why some Nazi experimenters turned to the use of prisoners in concentration camps."

Dr. Lester R. Dragstedt, NSMR's president, has labeled the bill "a cops and robbers game to drain away the time and resources of scientists . . ." and "an attempt by the antivivisection cult to strangle medical research with red tape."

Both NSMR and the Humane Society of the United States assume that the National Institutes of Health, which now administers medical research grants for the Gov-

ernment, would be the group given police powers.

NIH, although it does not yet have an official position, is expected by informed sources to oppose the bill.

Strangely enough, the Humane Society also opposes the Cooper bill, on the grounds that delegating police powers to NIH, itself a research organization, is merely asking the laboratories to police themselves.

In California, where the Society is engaged in a bitter court battle with two medical schools, an animal protection law that is seemingly stronger than the Cooper bill has been on the books for ten years. But it never has been enforced, the Society says, largely because public health officers interpret the law to fit their own ideas.

Laws that cannot be enforced are a "negative evil," giving false assurance to the public and protecting those guilty of cruelty, the Society charges.

Although no action is expected before

Congress adjourns, the bill is a "serious attempt to get some legislation passed," according to Humane Society executive director Fred Myers.

Between now and convening of the 87th Congress in January, 1961, various groups will try to draft more acceptable legislation.

The Humane Society will hold a meeting late in September. High on the agenda are discussions aimed at harmonizing the sentiments of its 500 chapters and 26,000 members, which at present range from near-antivivisectionism to a leniency accused of being traitorous to the Society's cause.

## Matter of Too Few Facts

In the right wing is New York City's Society for Animal Protective Legislation, responsible for drafting the Cooper bill. Although it is independent, it often joins forces with the Humane Society.

At the other end of the scale is a group known as WARDS (Welfare of Animals used for Research in Drugs and Surgery). This organization works closely with research groups and views much of the animal care problem as a matter of inadequate knowledge as to what animals need



**MOST POPULAR RESEARCH ANIMAL**—These white Swiss mice are being prepared for inoculation in the germ-free animal studies section at the National Institute of Allergy and Infectious Diseases. They are among an estimated 35,000,000 mice used annually in research. Second in popularity is the rat, of which 10,000,000 are used yearly.

rather than as intentional cruelty. The group points out that scientists have conducted few studies aimed at improving or evaluating laboratory animal care.

In the absence of specific standards, researchers around the country are setting up their own guidelines. The American Physiological Society has published general recommendations and flatly states that papers submitted for publication in either of its official journals will be refused if there is evidence of improper care or use of experimental animals.

The Assembly of Scientists, composed of 350 researchers from two of the seven National Institutes of Health, took note and is now working toward a similar goal. The interest that began "sort of as a discussion of an ethical question," as one scientist member put it, has materialized into recommendations now being presented to NIH officials as a code that could be adopted by all seven institutes.

"We are not trying to have this adopted as the rule for everyone or set ourselves up as better than anyone else," an Assembly member said. "Problems are not the same in every laboratory. Here we have no housing problem, but in other places that is the main trouble."

### Agree on Basic Idea

Like the American Physiological Society, the Assembly believes that refusing publication of a research paper is a highly effective whip for keeping scientists in line.

Both the humane and scientific groups agree on one point—that animals should be well treated.

Dr. Lester Dragstedt of NSMR put it this way: "Good care of laboratory animals is more than a matter of humanity. It is a matter of scientific accuracy and efficiency . . . because a stray germ in a test animal can waste all of the work put into a piece of research."

While the Humane Society hopes to gain support for a bill that favors policing from outside, the research groups are maneuvering into a better position for arguing that they are capable of handling their own affairs.

Conceding that some laboratories do their best to facilitate good treatment, humane groups nevertheless make the most of cases such as that in which unanesthetized animals were locked in a burning building for a study of what causes death in fires.

### Pets Prompt Criticism

Most of the concern for humane treatment centers around dogs and cats. Although proposed legislation invariably provides for all "living vertebrate animals," the critical letters received by scientists rarely refer to treatment of rodents. Mice and rats are the most popular research animals and, in numbers, are used, respectively, 200 and 80 times more often than dogs.

Whatever the sentiment, opposing factions are preparing to throw all their fire power into a Congressional battle they expect next session.

The scientific camp, which estimates that an annual total of \$1,000,000 is spent "fighting the antivivisectionists," believe "medical research is in for a bad time."

Science News Letter, July 9, 1960

### SURGERY

## Whole Blood Used During Surgical Chill

THE DEVELOPMENT of using whole blood in a heart-lung machine to chill a brain surgery patient's body to four degrees above freezing was reported by Dr. Sam T. Gibson, director of the American National Red Cross blood program.

Dr. Gibson said that surgeons at Duke University, using the heart-lung machine, piped whole blood through the body of a brain tumor patient. The blood was gradually chilled and, at 49 degrees Fahrenheit, the heart stopped. At 36 degrees, the electrical impulses indicating brain action halted.

The brain tumor was removed and the blood coursing through the patient's body was gradually warmed to body temperature. The surgery was successful, Dr. Gibson reported.

He said that scientists at Vanderbilt University are experimenting on laboratory animals to determine whether, after a heart attack, a heart-lung machine and donor blood could be used to keep the damaged heart outside the body until it can heal completely.

Science News Letter, July 9, 1960

### DENTISTRY

## Fluoride Concentrate Can Be Added at Home

A SODIUM FLUORIDE concentrate has been placed on the market for the dental protection of persons whose water supplies do not contain fluorine. The liquid is now available in New York, New Jersey, Oregon, Washington, Massachusetts, Nebraska, Michigan and southern California. Introduced by Crookes-Barnes Laboratories of Wayne, N. J., the liquid is available through prescription by a doctor or dentist for adding to beverages in the home.

Science News Letter, July 9, 1960

### MEDICINE

## Wrong Diagnosis Sends Many to TB Hospitals

FROM 3,000 To 4,000 patients are in 65 tuberculosis hospitals through wrong diagnosis of a lung disease, histoplasmosis, caused by a fungus, a study of these hospitals has shown.

Dr. Robert J. Anderson, chief of the U. S. Public Health Service's Communicable Disease Center in Atlanta, Ga., said such patients run the risk of becoming infected with TB. The 65 tuberculosis sanatoriums are participating in a CDC study, and have conducted blood tests on 30,000 patients to determine the correct diagnosis.

Histoplasmosis is acquired by inhaling dust containing spores of the fungus *Histoplasma capsulatum*. It is not transmitted from person to person. Widely distributed in the United States, the disease is mainly concentrated in the Middle West.

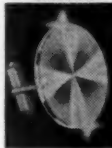
An experimental drug, amphotericin B, is being used as a remedy for histoplasmosis, but the Communicable Disease Center is trying to find better treatment as well as prevention methods.

Science News Letter, July 9, 1960

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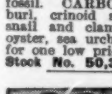
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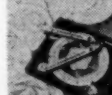


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# Books of the Week

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**ADVANCES IN APPLIED MICROBIOLOGY, Vol. 2**—Wayne W. Umbreit, Ed.—*Academic*, 384 p., illus., \$12. Covers newer aspects of waste treatment, aerosol samplers, microbiological assaying, microbial control in brewery, vinegar manufacture and advances in fermentation.

**AEROSPACE FACTS AND FIGURES 1960**—Rudolf Modley and others, Ben S. Lee, Ed.—*Am. Aviation Pubs.*, 149 p., illus., paper, \$2. Compilation of data on aircraft and missile production.

**AMINO ACIDS, PROTEINS AND CANCER BIOCHEMISTRY**—John T. Edsall, Ed., preface by Sidney W. Fox and Julius Schultz—*Academic*, 244 p., illus., \$7. Papers presented at the Jesse P. Greenstein Memorial Symposium, with biographical article and bibliography.

**ANATOMY: A Regional Study of Human Structure**—Ernest Gardner, Donald J. Gray and Ronan O'Rahilly—*Saunders*, 999 p., illus. by Caspar Henselmann, \$15. Textbook for undergraduate medical and dental student, stressing importance of relationship between structure and function, and including relevant references for the advanced student.

**APPLIED BOOLEAN ALGEBRA: An Elementary Introduction**—Franz E. Hohn—*Macmillan*, 139 p., paper, \$2.50. Simple introduction to basic Boolean algebra, and some of its applications.

**BASICS OF GYROSCOPES, Vols. 1 & 2**—Carl Machover—*Rider*, 112 p., 120 p., illus., \$7.75 per set; paper, \$3.30 each. Vol. 1 tells what gyro is, how it works, and treats vertical gyro and components. Vol. 2 discusses rate and integrating gyros, stable platforms and inertial navigation.

**BERTRAND RUSSELL SPEAKS HIS MIND**—*World Pub. Co.*, 173 p., \$3.50. Transcript of television dialogues presenting Nobel Prize winner's controversial thinking about vital problems of modern man.

**BORATE GLASSES**—L. Ya. Mazelev, transl. from Russian—*Consultants Bureau*, 159 p., illus., \$10. Based on the results of investigating

silicate and borate glasses, discusses thermochemical processes in glass formation, crystalloptics and physicochemical properties.

**CAREERS IN ASTRONAUTICS AND SPACE EXPLORATION**—Juvenal L. Angel—*World Trade*, 50 p., illus., paper, \$1.50. Describes the field, specializations required, nature of work, lists educational institutions and bibliography.

**CARTESIAN GEOMETRY OF THE PLANE**—E. M. Hartley—*Cambridge Univ. Press*, 324 p., \$3.75. Intended as a first course in coordinate geometry, uses pure and analytical methods throughout.

**CONDITIONED REFLEXES: An Investigation of the Physiological Activity of the Cerebral Cortex**—I. P. Pavlov, transl. from Russian and ed. by G. V. Anrep—*Dover*, 430 p., illus., paper, \$2.25. Unabridged reprint of first English translation published in 1927.

**DISEASE AND THE ADVANCEMENT OF BASIC SCIENCE**—Henry K. Beecher, Ed.—*Harvard Univ. Press*, 416 p., illus., \$12.50. Lowell Lectures, examining a newly emerging role of the university hospital, that of advancing pure science through the study of disease in the hospital ward.

**ELEMENTS OF GENERAL CHEMISTRY**—Jay A. Young—*Prentice-Hall*, 466 p., illus., \$6.95. One-semester elementary and practical introduction to chemistry, serving both as foundation or terminal course.

**EXPLORING THE AIR OCEAN**—Frank H. Forrester—*Putnam*, 70 p., illus. by Robert Eggers, \$2.75. About the science of meteorology, written for those aged 8-12.

**FLAT ROLLED PRODUCTS, II: Semi-Finished and Finished**—E. W. Earhart and R. D. Hindson, Eds.—*Inter-science*, 150 p., illus., \$4. Proceedings of the Second Technical Conference sponsored by the Metallurgical Society of AIME, Chicago, January, 1960.

**FRONTIERS OF THE SEA: The Story of Oceanographic Exploration**—Robert C. Cowen, introd. by Roger R. Revelle—*Doubleday*, 307 p., illus. by Mary S. Cowen, photographs, \$4.95. About past, present and future of oceans and oceanographic research.

**GERMAN-ENGLISH SCIENCE DICTIONARY for Students in Chemistry, Physics, Biology, Agriculture and Related Sciences**—Louis De Vries—*McGraw*, 3rd ed. (1959), 592 p., \$7. Includes over 3,000 new terms that have become important since the end of World War II.

**HANDBOOK OF GEOPHYSICS—U.S. Air Force—Macmillan, rev. ed., 680 p., illus., \$15. Comprehensive reference work of recent data gathered from satellite and rocket observations, solar observatory, Arctic expeditions, aircraft and balloon flights, and laboratory experiments.**

**HORNS, STRINGS, AND HARMONY**—Arthur H. Benade—*Doubleday*, 271 p., illus., paper, 95¢. This book on musical physics tells how music is formed by pianos, violins, bugles, saxophones and many other instruments.

**HOW TO CHOOSE YOUR TECHNICAL INSTITUTE: A Career as an Engineering Technician**—Walter M. Hartung and George W. Brush, Jr.—*Bellman*, 30 p., illus., paper, \$1. A guide for students and parents.

**HOW TO KNOW THE WATER BIRDS**—H. E. Jaques and Roy Olivier—*Brown, W. C.*, 159 p., illus., \$3; paper, \$2.50. More than 225 species of U.S. and Canadian water birds are keyed, pictured and described.

**INSTABILITY CONSTANTS OF COMPLEX COMPOUNDS**—K. B. Yatsimirskii and V. P. Vasil'ev, transl. from Russian—*Consultants Bureau*, 214 p., \$6.75. Introductory section of a general theoretical nature, followed by instability constants of 1381 complex compounds.

**MEDICAL PHYSICS, Vol. III**—Otto Glasser, Ed.—*Year Bk. Pubs.*, 754 p., 595 illus., \$25. Up-to-date presentation by experts of advances in the application of medico-physical and biophysical principles, in the interpretation of living processes by physical laws, and in the development of physical methods and instruments. Alphabetical arrangement by title.

**MITs, WITS AND LOGIC**—Lillian R. Lieber—*Norton*, 3rd ed., 240 p., illus. by Hugh Gray Lieber, \$3.95. Combining mathematics and art, the book presents unconventional introduction to logic and its place in life.

**MODERN MATHEMATICS: An Introduction**—Samuel I. Altwerger—*Macmillan*, 462 p., \$6.75. Aimed at those college students whose appreciation and understanding of modern mathematics will be enhanced by a comprehensive presentation.

**OF MICE, MEN AND MOLECULES**—John H. Heller, introd. by Vannevar Bush—*Scribner*, 176 p., photographs, \$3.95. Research scientist opens before the layman some exciting vistas of basic biological research.

**ORGANIZING THE TECHNICAL CONFERENCE**—Herbert S. Kindler—*Reinhold*, 139 p., illus. by Joseph H. Callay, \$6. Describes tried conference techniques for organizing smaller meetings.

**PRINCIPLES OF OPTICAL CRYSTALLOGRAPHY**—A. V. Shubnikov, transl. from Russian—*Consultants Bureau*, 186 p., illus., \$9.50. Parallels the course on optical crystallography given at Moscow State University.

**PROPERTIES OF ELEMENTAL AND COMPOUND SEMICONDUCTORS**—Harry C. Gatos, Ed.—*Inter-science*, 340 p., illus., \$8.50. Papers and discussions of the Metallurgical Society Conference, 1959.

**THE PSYCHOLOGY OF DEAFNESS: Techniques of Appraisal for Rehabilitation**—Edna Simon Levine—*Columbia Univ. Press*, 383 p., illus., \$7.50. Pioneering treatise on the complex psychology of serious hearing impairment, on psychological practice in rehabilitation setting and on psychological examination and evaluation of data.

**PUBLICATION INDEX: 1956-1959—Highway Res. Bd., 129 p., paper, \$2.60. Contains references to papers and reports presented at the 35th through 38th annual meetings.**

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**RADIOACTIVITY FOR PHARMACEUTICAL AND ALLIED RESEARCH LABORATORIES**—Abraham Edelmann, Ed.—*Academic*, 171 p., illus., \$6. Symposium sponsored by Nuclear Science and Engineering Corporation, held in Uniontown, Pa.

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Science News Letter, July 9, 1960

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## Questions

**ASTRONAUTICS**—How fast does a "Ballute" inflate? p. 21.

**ASTRONOMY**—How often does the Finlay comet reappear? p. 22.

**BIOLOGY**—What is the first step in photosynthesis thought to be? p. 19.

**MEDICINE**—Why does the Humane Society oppose the Cooper Bill? p. 26.

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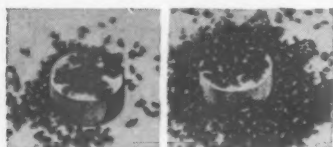
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## AERONAUTICS

### Aircraft Position Found From Pilot's Voice

A METHOD by which the position of an aircraft can be pinpointed with "near perfect" accuracy has been demonstrated at the British Exhibition in New York. Use is made of the source of the pilot's voice communications with the ground which are picked up by three stations on the ground. These stations determine the direction from which the voice is coming with high accuracy, and fix the plane's position by triangulation.

Science News Letter, July 9, 1960

## Do You Know

There are more than 200 planetariums throughout the world; one of the newest ones is in Astrakhan, Russia.

Of the 37,800 Americans killed in auto accidents during 1959, nearly one-fifth were killed on a Saturday.

The planet Uranus is 1,783,000,000 miles from the sun and has a temperature of about 310 degrees below zero Fahrenheit.

The weaver bird, a small creature with red beak, black collar and beige feathers, is an ancient plague of Africa, as destructive to grain crops as the locust.

Among overweight women, the heart disease death rate is 50% above that for women of standard weight; cancer, diabetes, pneumonia and influenza, and diseases of the digestive system also have much higher death rates among overweight women.

More than 90% of the basic research in universities and colleges is now being supported by Federal Government funds.

## MICRO-ADS

Equipment, supplies and services of special interest to scientists, science teachers and students, science-minded laymen and hobbyists. 25¢ per word, payable in advance. Closing date 8 weeks prior to publication (Saturday).

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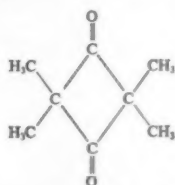
### Smells like menthol

Our pilot plant for *Tetramethyl-1,3-cyclobutanedione* from dimerized ketene has gone on stream.

It is a promising organic intermediate. This is a colorless way of saying that even if we knew the route by which Joe Public eventually buys it, it would be too long a story to tell. If Fortune smiles, some chemical descendant of this dione, a remote descendant very likely, will have a part in pleasing Joe. It may wash cars, kill weeds, scare sharks, shed rain, smell good, fight fires, heal the sick, or die on the vine.

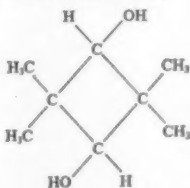
Such language is unsuitably direct. At this stage, sales talk must be kept scholarly. Our chemists proceed like a chef with a fresh, fat partridge and an armory of herbs and spices for sauce.

We offer



the first four-membered ring at a price we believe commercially interesting. It can be left a ring or be split open in interesting ways. It reacts with the usual carbonyl group reagents, but the reaction can proceed further to yield heterocyclics. It resembles menthol and camphor in odor and volatility.

We also offer the ring hydrogenated to the secondary glycol, *2,2,4,4-Tetramethyl-1,3-cyclobutanediol*,



which forms very stable diesters, as for plasticizers and lubricants. It forms both saturated and unsaturated polyesters. Not the least of its charms is the white, translucent, waxy polymer in which silicon atoms can link it.

To get a line on price, one writes Eastman Chemical Products, Inc., Kingsport, Tenn. (Subsidiary of Eastman Kodak Company) and thus gives us an opportunity to send the scholarly details complete.

This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science

### Nice sharp pictures

We must not lose our sense of proportion. We must recognize that some people take so little technical interest in photography that they have never even heard of *Kodak Tri-X Pan Film*. Others who do use it have noticed that since that "Improved Type" has appeared on the carton, results have somehow improved. Most of these folk will be content with a bland assertion that the recently added notation signifies a major advance in reduction of graininess and improvement in picture sharpness. A single congenial luncheon table could probably accommodate all who would press us to explain that what we have really done is to increase the peak value of the informational sensitivity *I* of *Kodak Tri-X Pan Film* from .0016 to .0036

$$\text{where } I = \frac{g}{a_s} \cdot \frac{1}{\sigma_s(D)}$$

$g$  = gradient of the linearized characteristic curve  
 $a_s$  = area of the spread function

$\sigma_s(D)$  = standard deviation of the granularity trace for a scanning aperture having the size of the spread function.

If you want to talk like that you should first consult *Journal of the Optical Society of America*, 48, 926, but if you just want very sharp pictures from very fast film, ask the Kodak dealer for *Kodak Tri-X Pan Film, Improved Type*.

### Four of us at Woods Hole

Four of us expect to put in a rugged week on Cape Cod beginning early on the morning of August 1. It's not exactly an exhibit or symposium or anything as formal as that. It's just that the management of the Marine Biological Laboratory at Woods Hole has given us to understand that if we want to hang around for five days dispensing free advice on how to use photography to communicate results of biological investigation, they will probably refrain from calling the cops to throw us off the premises.

One of us will be there to hold court on problems encountered in photomicrography and photomacrography of marine life—movies or stills, color or black-and-white. Another of us will

take over when questions come up of photographing living small specimens at natural size or less, with or without flash. The third man knows a lot about photographic materials for electron micrography, autoradiography, and microradiography. The fourth, a biochemist, will make himself generally pleasant and helpful.

We figure any time spent feasting on *Homarus americanus* is time lost from showing our movie of *Homarus americanus* hatching in glorious Eastman color.

### Gelatin responsibly dyed

A rich legacy of heuristic nonsense has been accumulating for generations in the next region of the electromagnetic spectrum over from the infrared, where the eye reigns supreme as the receptor and has qualified every seeing, thinking man to hold opinions. Even the mighty Johann Wolfgang Goethe, author not only of "Faust" but also of "Die Farbenlehre," put in his *zweipfennig* worth.

Amid rampant intellectuality, it has behooved us to tread lightly and confine our thinking to such *farbenlehre* as will fit us the better to flood the earth with color photography, myriad-colored Tenite plastics, color-locked Chromspun fibers, and Eastman textile dyes. Plus another field of dye art, tiny in economic comparison and disproportionately demanding in technical patience but important to those who, whatever their theories or purposes, wish to modify spectral distribution or overall intensity of light in systematic, quantitative, reproducible, simple, and inexpensive fashion. We refer to the celebrated little marvel of precision dye chemistry, the *Kodak Wratten Filter* of uniform gelatin, with or without glass mounting.

The reason we refer to it is that the new 20th edition of "Kodak Wratten Filters for Scientific and Technical Use," containing 81 pages of curves, data, and other useful information, is now obtainable from well-stocked photographic stores for 75¢ or from Eastman Kodak Company, Sales Service Division, Rochester 4, N. Y.

Price quoted is subject to change without notice.

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# New Machines and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D.C., and ask for Gadget Bulletin 1047. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

**LIGHTED SHAVER**, a cordless electric shaver with rechargeable battery, features two lights near the shaving head. These lights help the user shave in dim light or darkness. The rotary action shaver may be recharged in both 110-volt and 220-volt wall outlets.

Science News Letter, July 9, 1960

**"GRANDMA'S BRAG BOOK"** is written in silver on the simulated leather cover of a photograph album especially designed for photos of grandchildren. Bound with a plastic spiral, the pages lie flat when the album is open. It is available in several colors.

Science News Letter, July 9, 1960

**PANEL NIGHT LIGHT** utilizes new electroluminescent techniques to provide a round panel of soft, green light. The light has no bulb; instead it has a ceramic plate with electroluminescent phosphors on one side, and a current-carrying coating on the other. The unit plugs directly into a wall socket and has a life expectancy of nearly five years of continuous burning.

Science News Letter, July 9, 1960

**ALUMINIZED GLOVES**, shown in the photograph, designed to reflect 90% of all radiant heat in work where high temperatures are required, have leather palms and



aluminized asbestos backs and thumbs. The gloves are long enough to protect wrists.

Science News Letter, July 9, 1960

**CITIZENS BAND TRANSCEIVER KIT**, when assembled, produces a receiving and sending unit for short-distance, two-way

communications use in the new 27-megacycle Citizens Radio Class D band. The finished unit may be used in a home or attached under the dashboard in an automobile. Units have an effective range of up to 20 miles, depending on antenna height and terrain.

Science News Letter, July 9, 1960

**GOLF BALL HOLDER**, a small plastic unit, clips to golfer's bag or belt to keep four tees and two balls handy. A dial on the clip permits the golfer to keep track of his score without getting out a pad and pencil at each hole.

Science News Letter, July 9, 1960

**PLASTIC LINKS**, for young engineers to build toys with, are tough but easy to bend. This feature permits the building of curved shapes such as ferris wheels, gondolas and windmills. Each rectangular link has peg-and-hole fastening devices at its four corners.

Science News Letter, July 9, 1960

**CAMPING-BOAT TRAILER** will carry a 14-foot boat in transit. But at camping site, the trailer unfolds into an 11-foot-wide unit with two double beds and a center aisle for a dining table. The trailer is of aluminum and steel with an army duck top.

Science News Letter, July 9, 1960



## Nature Ramblings



By HORACE LOFTIN

"DEAR SIR," the note read. "Here are two baby blue jays which we found abandoned on the ground. We cannot keep them in the dormitory. Please do not stuff them for the museum or make specimens of them. Just feed and take care of them. They eat chopped meat."

There was a cardboard box along with the note. Two diminutive jays, coming into their flight feathers, were huddled in a corner of the box. When the professor poked an inquisitive finger toward them, they were too weak to offer resistance or even to squawk as baby jays should.

According to instructions on bird care which the professor hastily consulted, baby jays should be fed every two hours—from 6 a.m. to 7 p.m.! It would not be necessary to give them water as they would get enough in their food. Water might strangle them. But even if he were able to follow such a feeding schedule, it was obvious to the professor that his feathered foundlings could not long survive.

### Foundling Birds



His attempts at feeding failed from the start. The birds were too weak even to respond to forced feeding. They lasted for half a day, then succumbed to dehydration and starvation.

Now, the note was signed "Two Biology students." The professor had his doubts as to how learned these students were in the field of biology. From the condition of the birds' feathers, it was obvious that they were not abandoned, but had left the nest in first attempts at flying. Without a doubt, the parents of the two jays were close when the "abandoned" birds were found.

Thus, misguided sentiment had accounted for the deaths of the two jays! If they had been left in the wilds—where they belonged!—their chances of survival would have been increased immeasurably.

This is not to say that one or both might not have fallen prey to a cat or other enemy. But, fed and protected by their parents, they would have had a fighting chance to survive. In nature, this is what every creature is given—a fighting chance, but no more. In well intended captivity, the young birds were denied this chance.

Of course, it is quite possible and even practicable to take a young bird from the nest and, with all the constant attention of an overworked mother bird, raise it successfully.

Some warm-hearted persons with much time on their hands do this regularly as a hobby. But unless you have the quality of patience and the gift of almost unlimited time, your sentiment will be better directed to leave nestling birds to nature and their natural parents.

Science News Letter, July 9, 1960

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